T27

Field Test in Santa Cruz
Volume 2
Figures

FIELD TEST OF THE LINS METHOD FOR THE RECOVERY OF OIL FROM TAR SAND

Volume 2

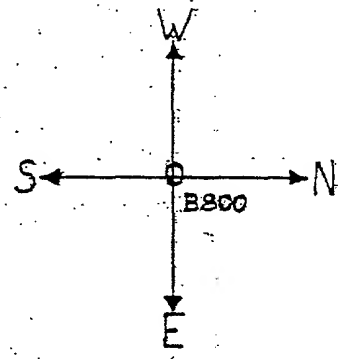
Figures

SANTA CRUZ, CALIFORNIA

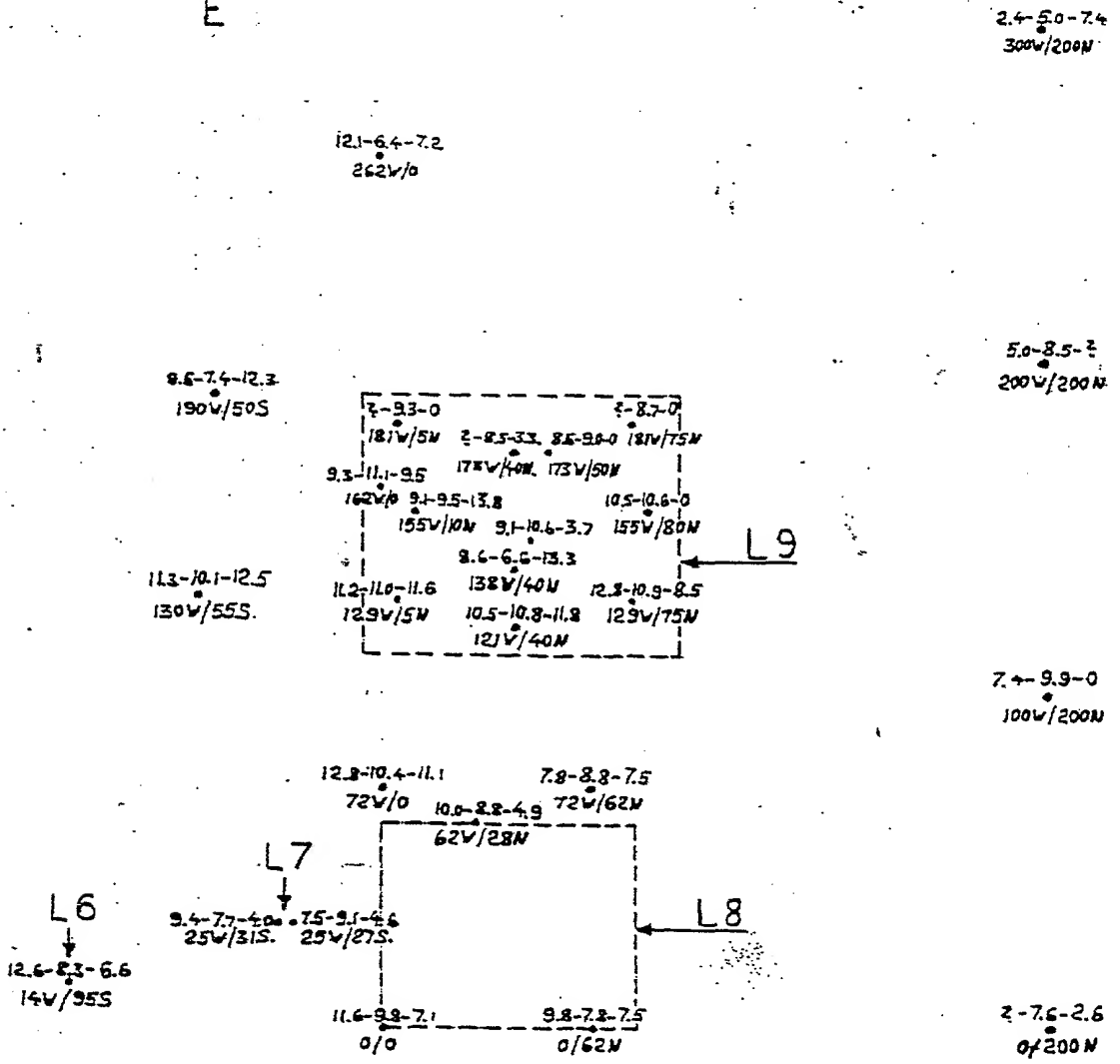
Figure 1

LO-213
DEC. 20. 1957. SP

TAR CONTENTS.



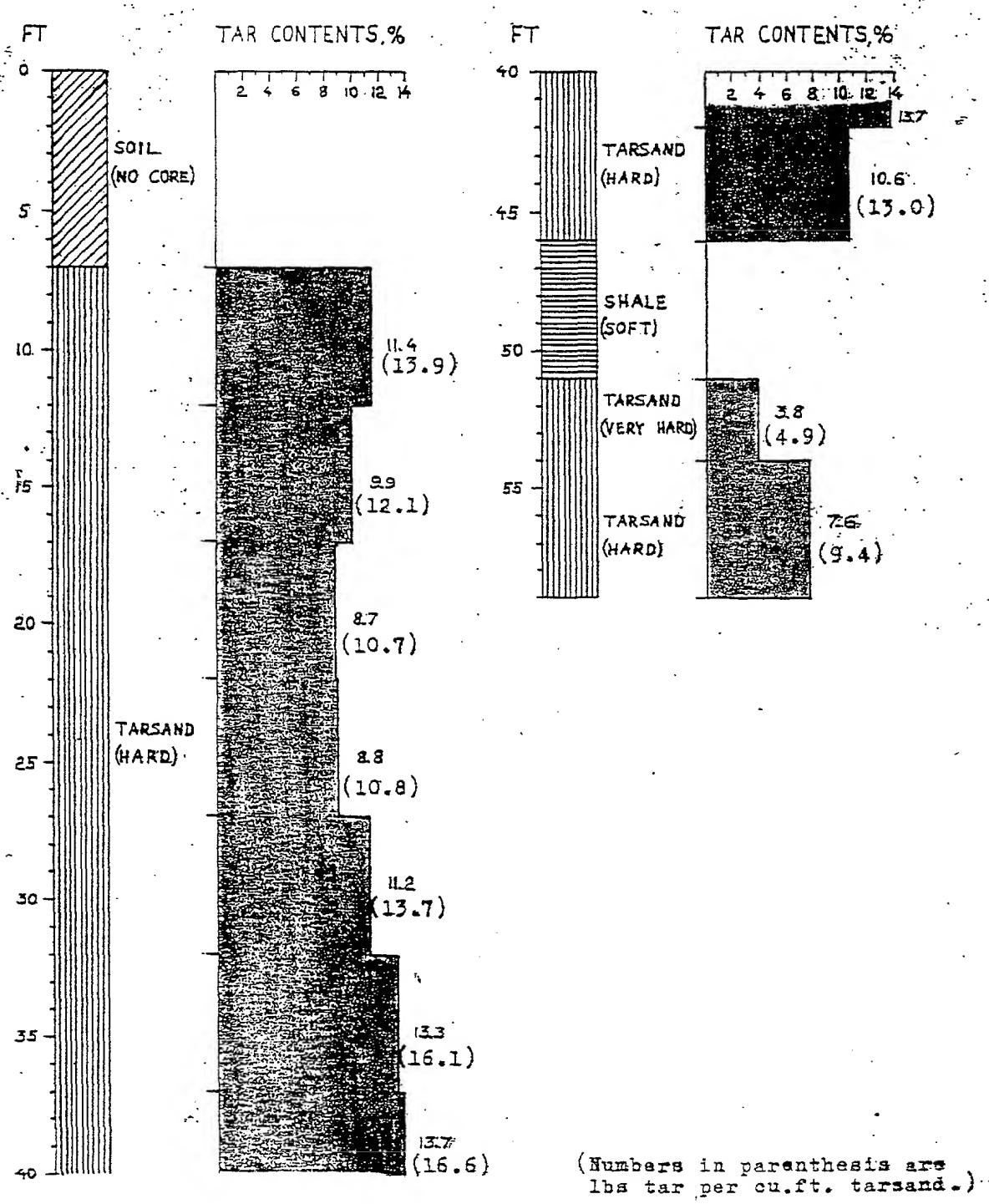
HOLE POSITION IN FT FROM B800 IN L8.
SCALE: 1" = 50'.
TAR CONTENTS IN % BY WEIGHT OF DRY TARSAND FROM 10-15 FT, 15-40 FT AND 40-45 FT, WRITTEN ABOVE THE HOLE POSITION.



L9-200
AUG. 30 1957 88

Figure 2

WELL LOG
121 W/40 N. (B2-5)

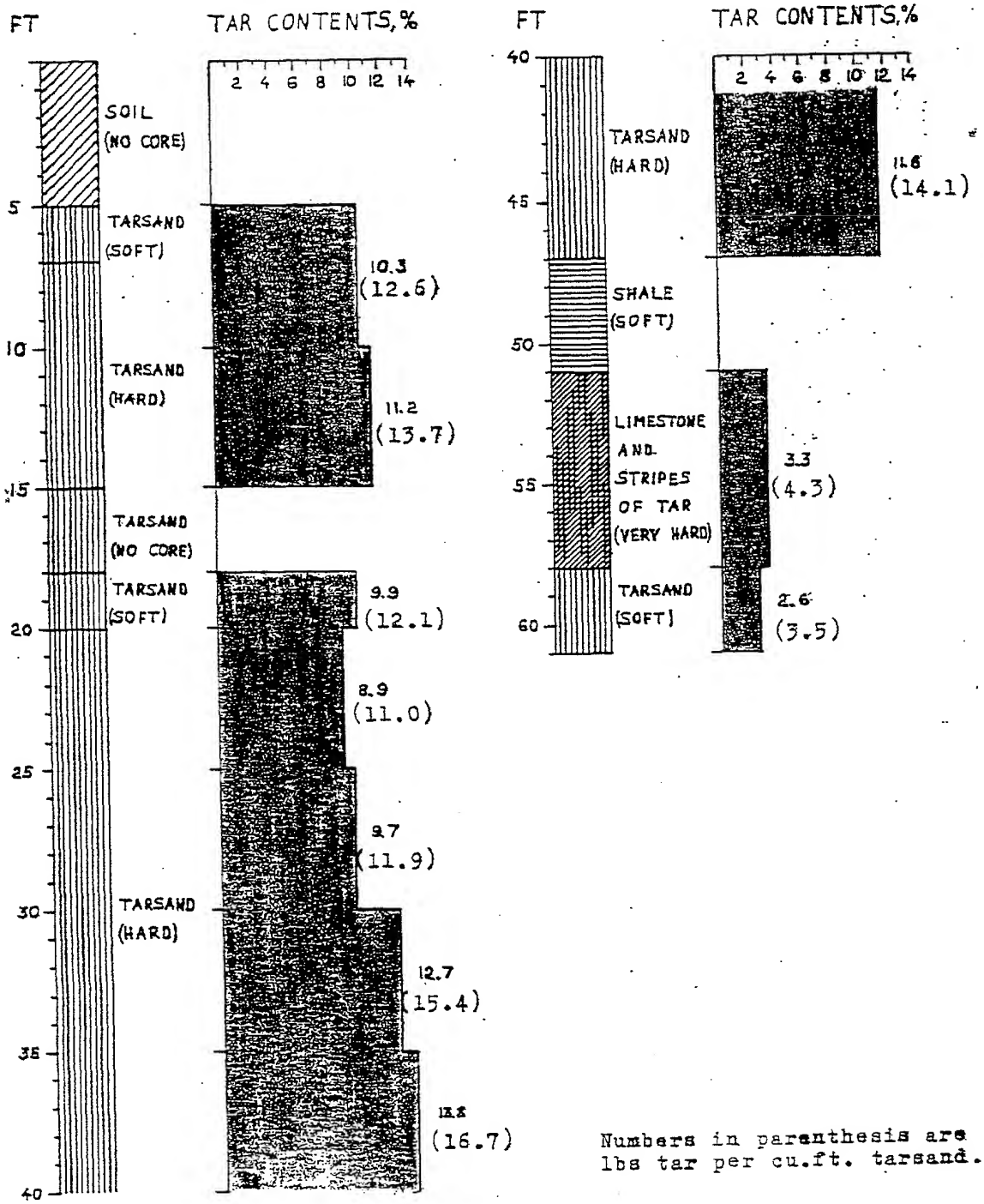


(Numbers in parenthesis are lbs tar per cu.ft. tarsand.)

L9-201
AUG.30.1957

Figure 3

WELL LOG
129 W/5 N. (B3-2)

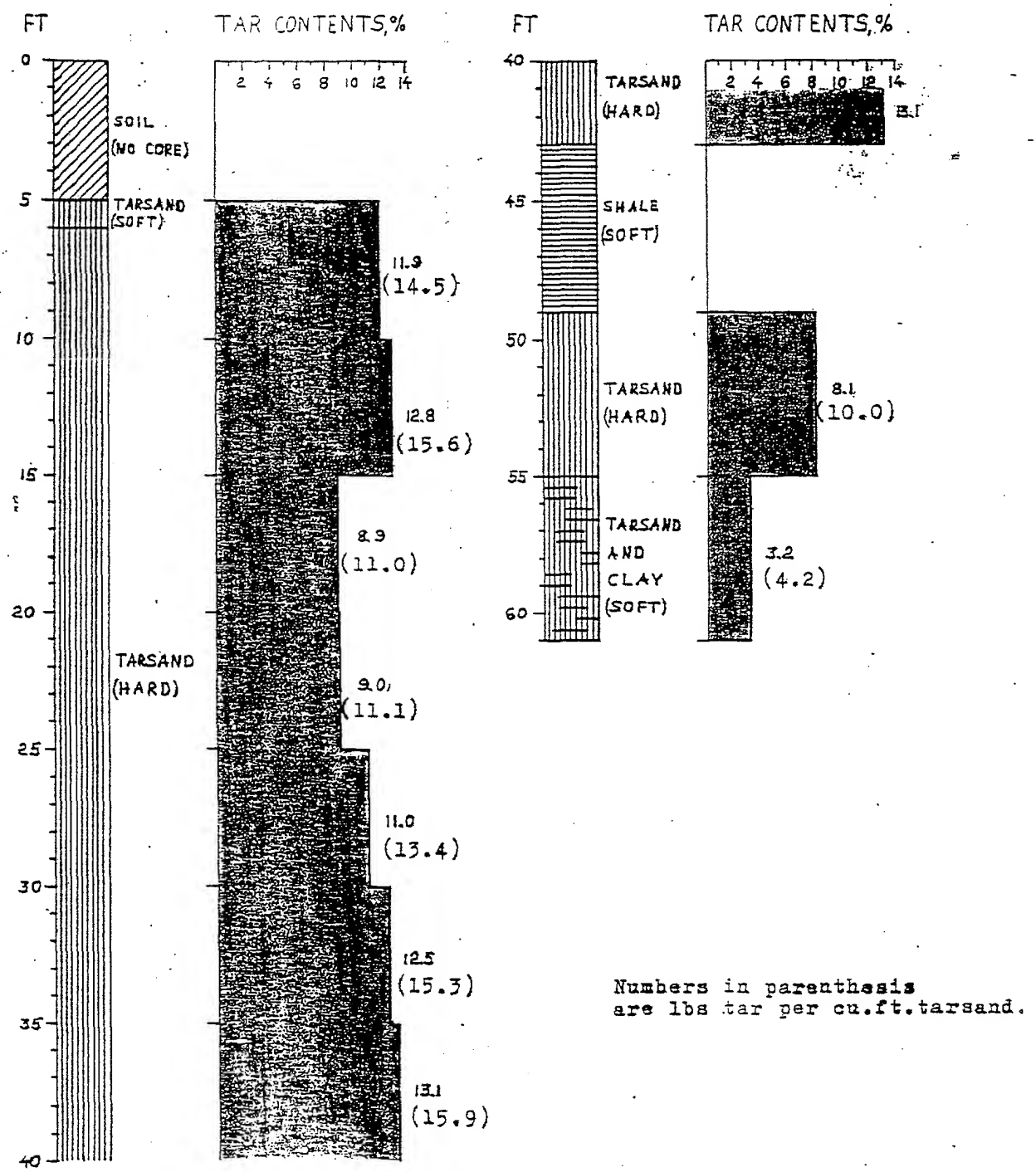


Numbers in parenthesis are lbs tar per cu.ft. tarsand.

L9-202.
AUG.30.1957.89.

Figure 4

WELL LOG
129 W/75 N. (B3-9.)



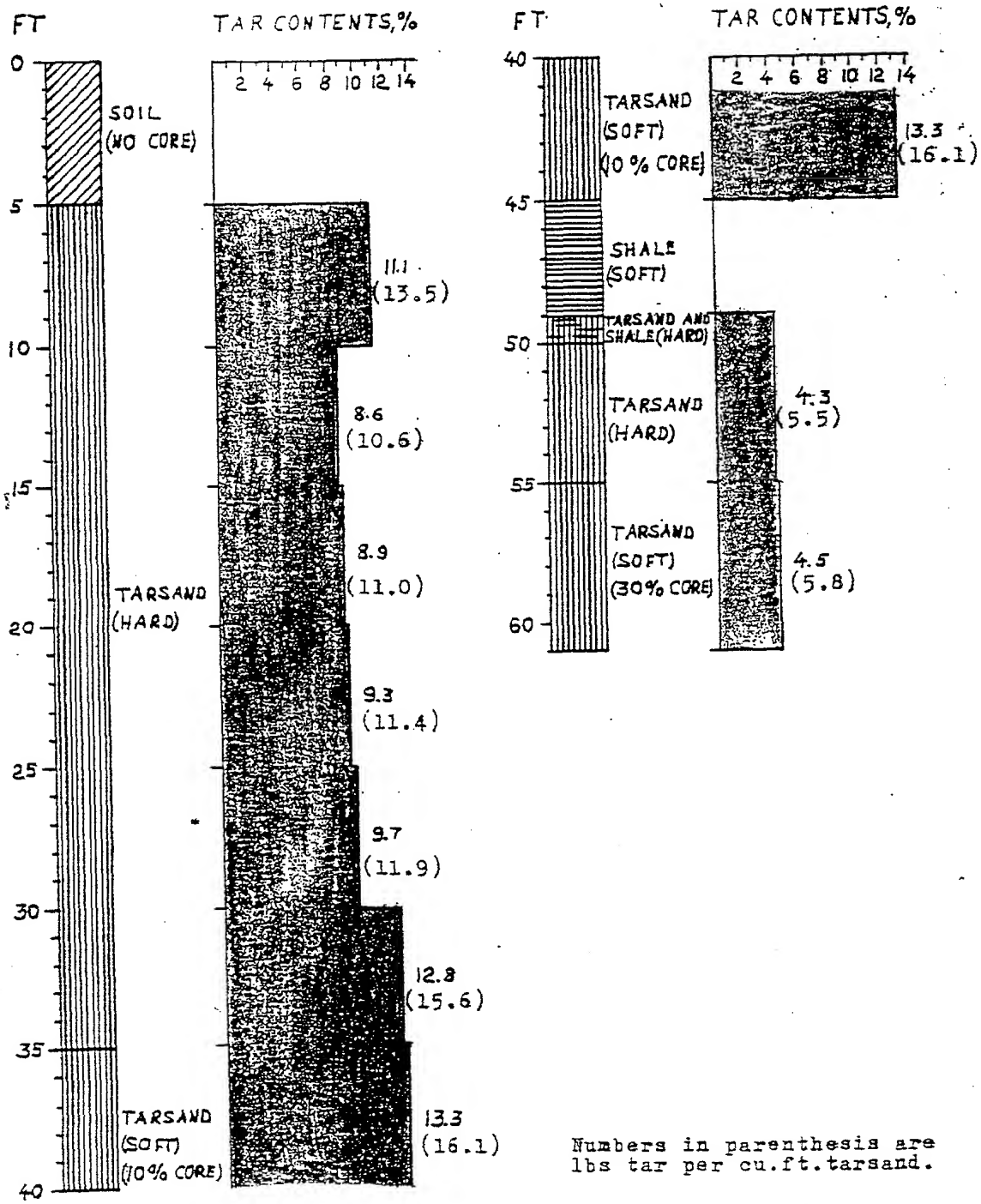
Numbers in parenthesis
are lbs tar per cu.ft.tarsand.

L9-203.
AUG.30.1957.8?

Figure 5

WELL LOG

138 W/40 N. (B4-5)

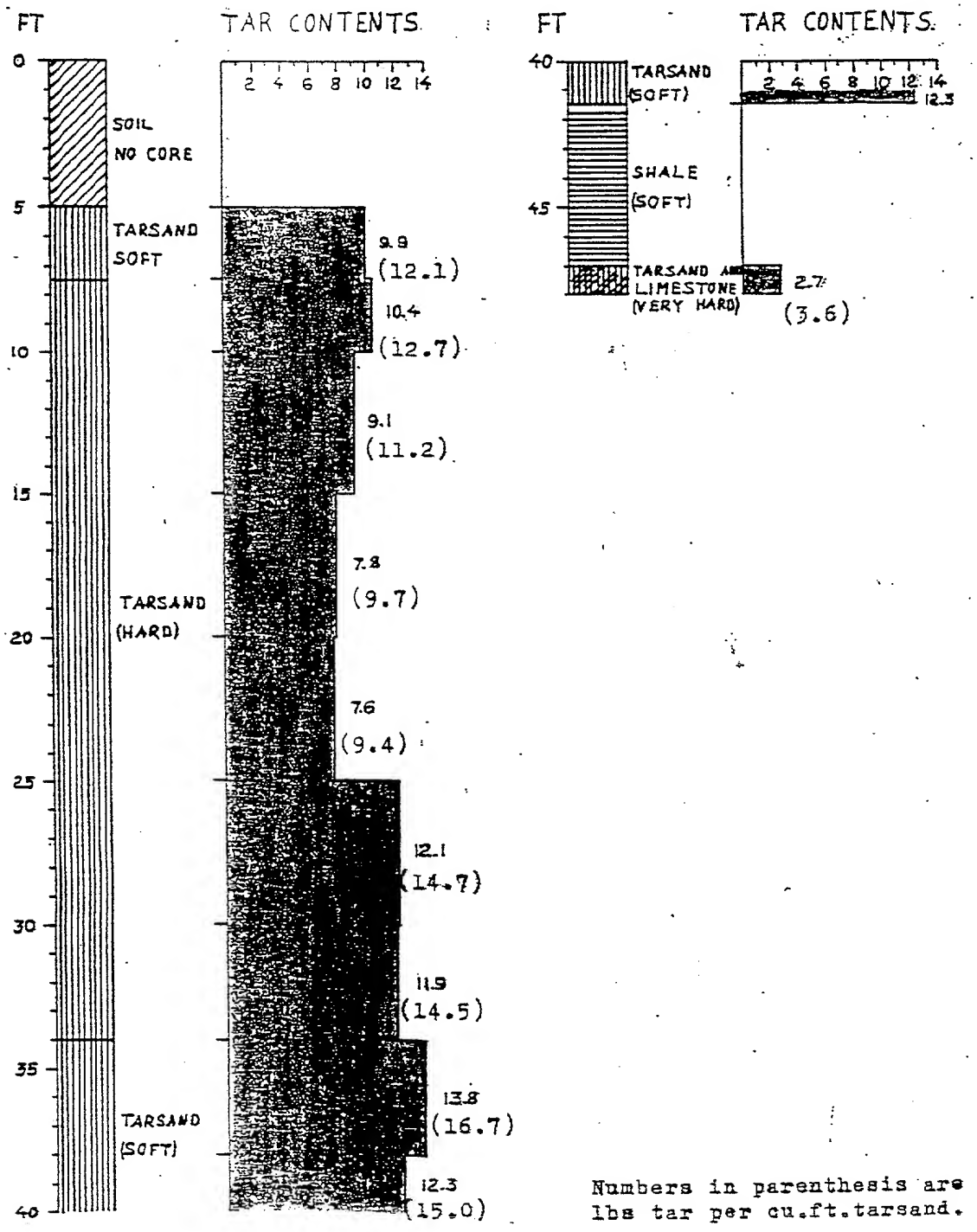


Numbers in parenthesis are lbs tar per cu.ft.tarsand.

L9-212
OCT 18.1957 88

Figure 6

WELL LOG
147 W/45 N. (B5-6)



Numbers in parenthesis are lbs tar per cu.ft.tarsand.

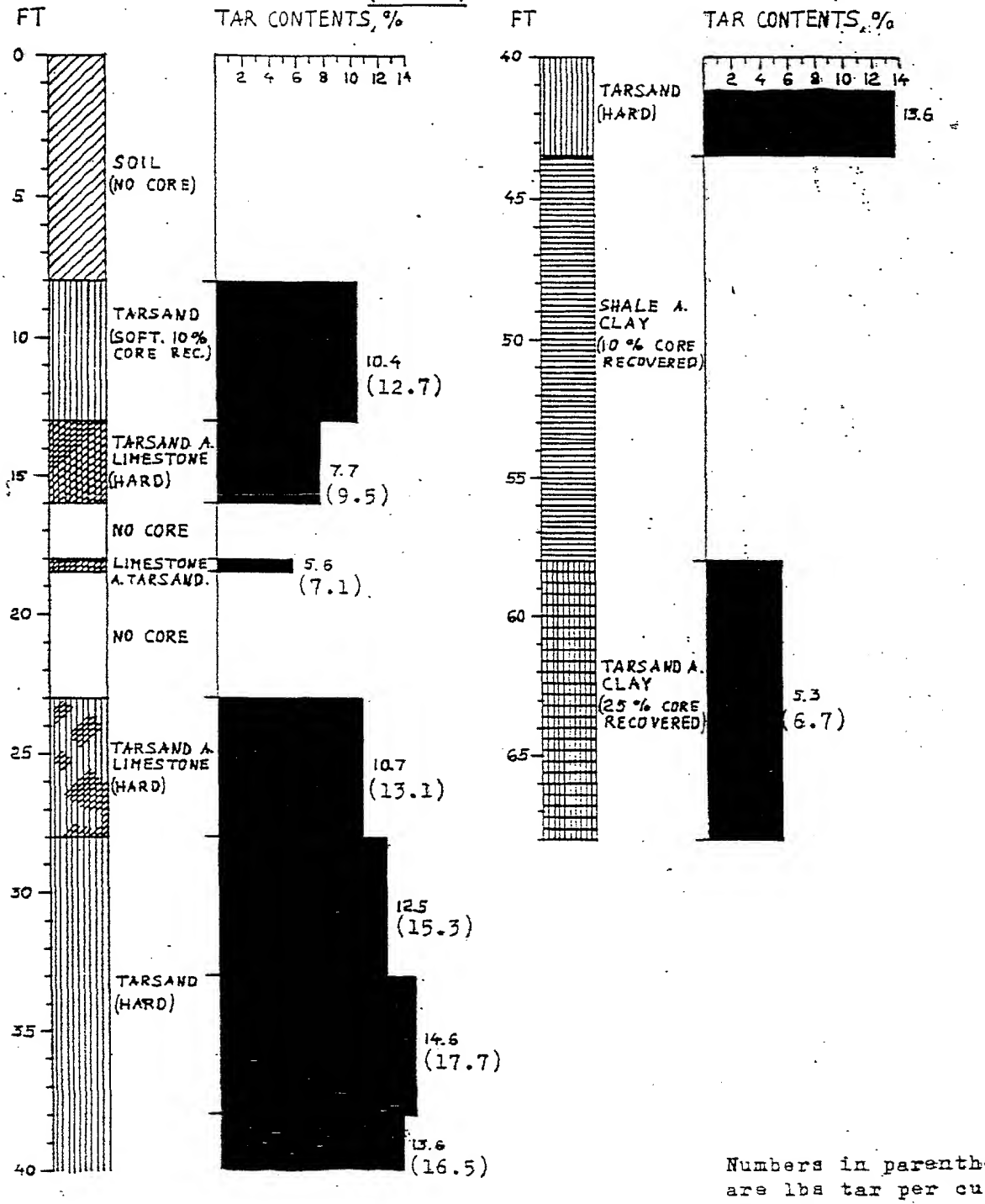
L9-204
1957 MAY 2 - 89

Figure 7

WELL LOG.

162 W/O.

(T 61.)

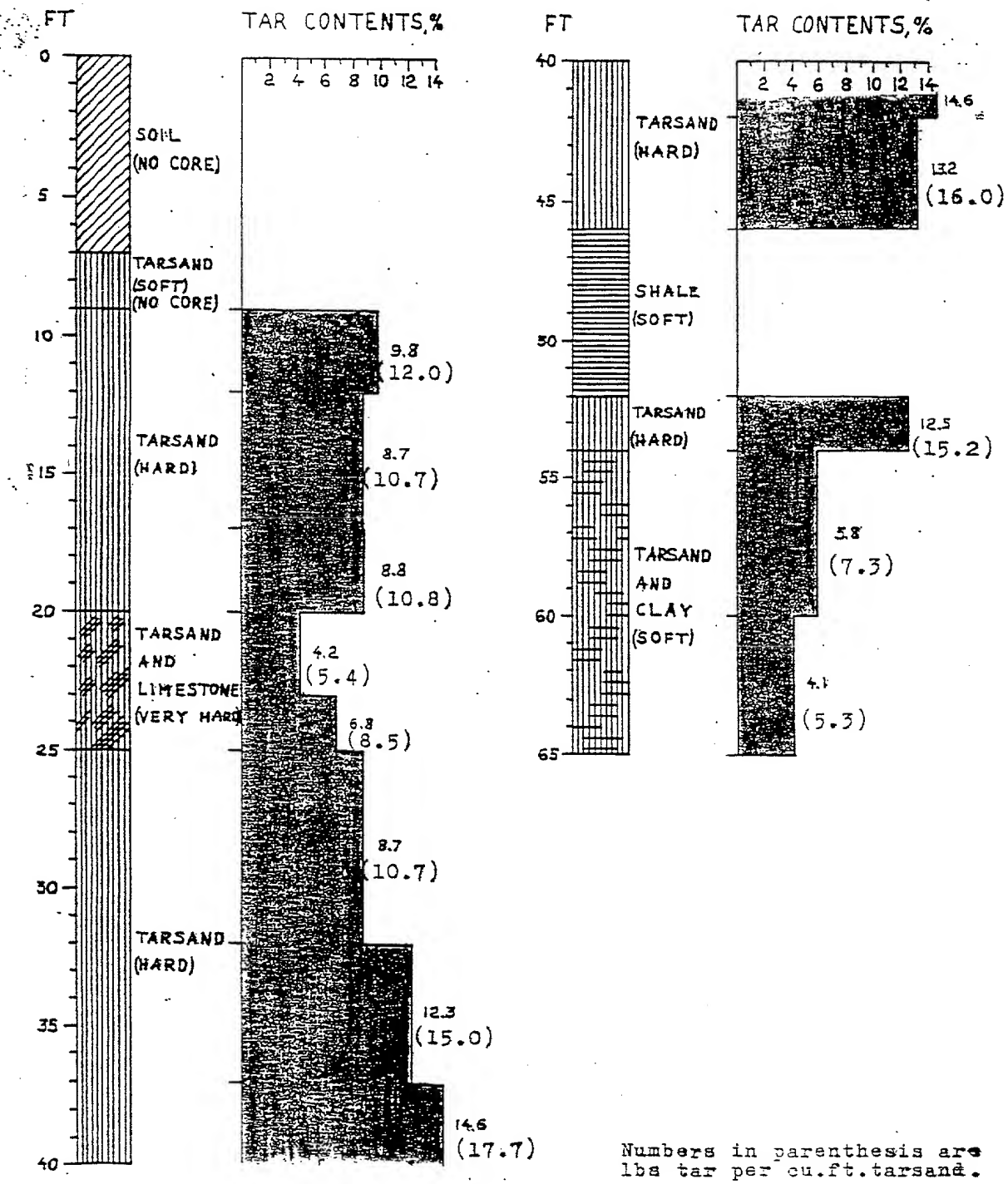


Numbers in parenthesis are lbs tar per cu.ft. tarsand.

L9-205
OCT.18.1957 SP

Figure 8

WELL LOG
155 W/10 N. (B6-2.)

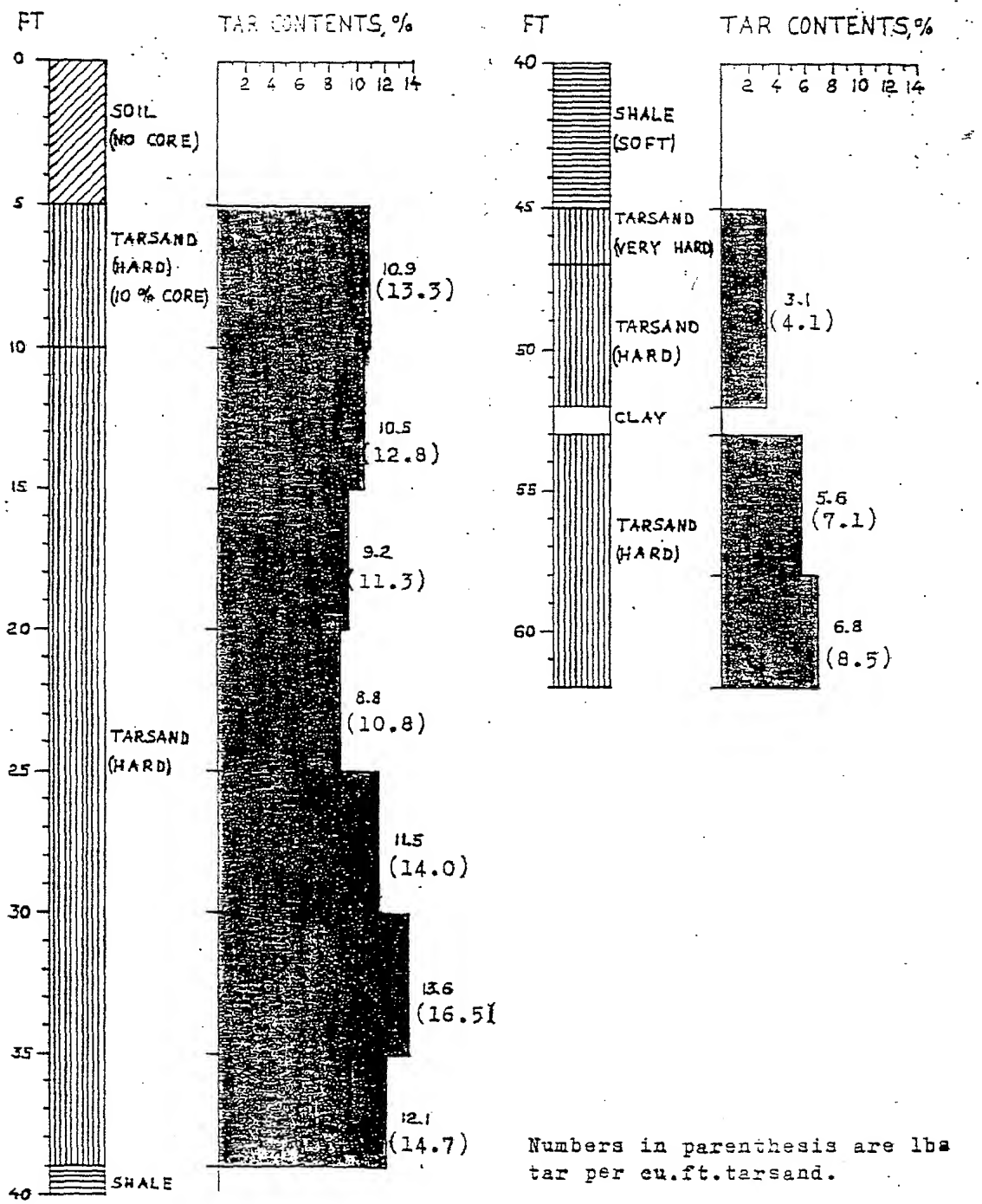


Numbers in parenthesis are lbs tar per cu.ft.tarsand.

L9-206.
AUG. 30. 1957. BP.

Figure 9

WELL LOG.
155 W/80 N. (B6-9.)

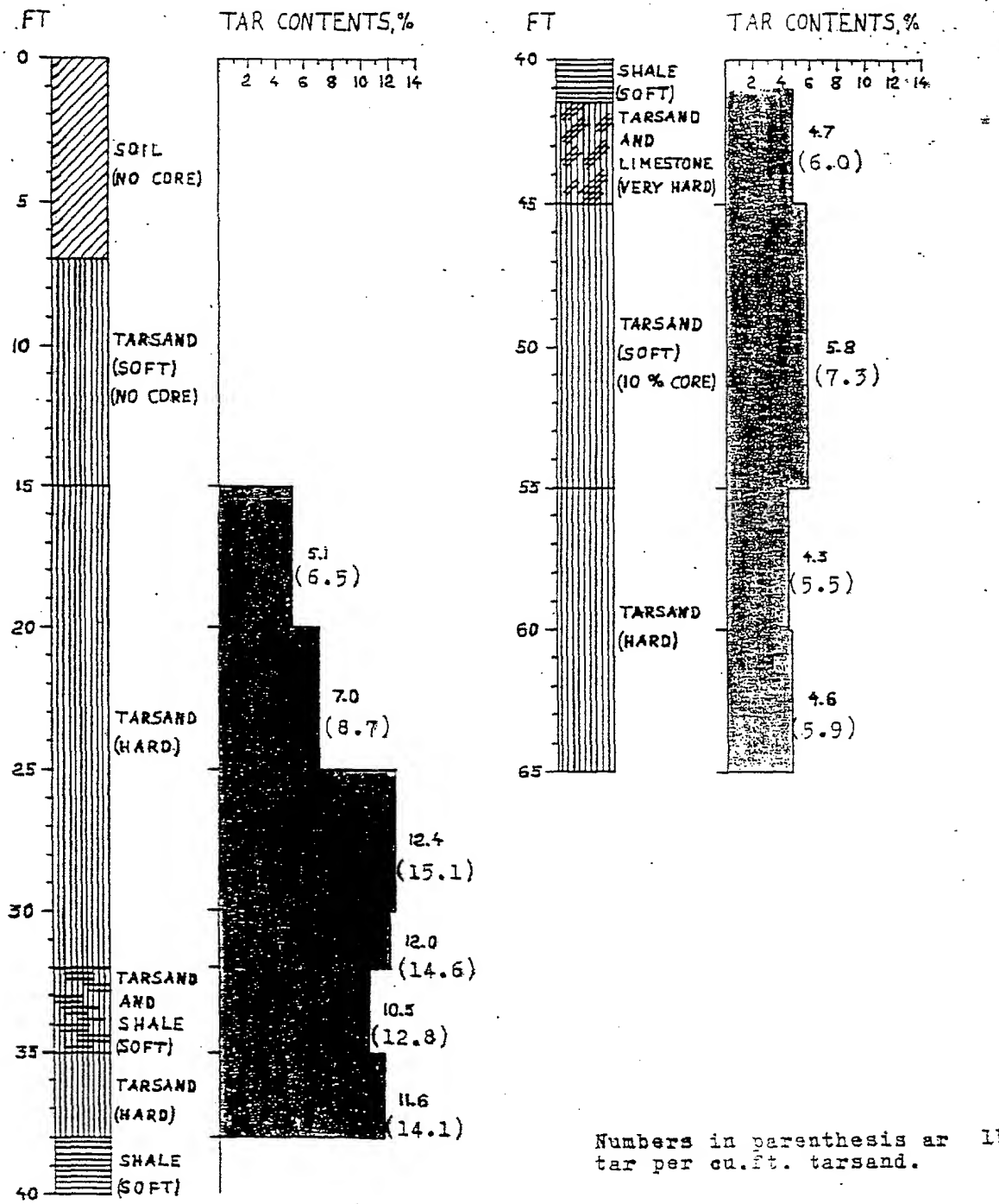


Numbers in parenthesis are lbs tar per cu.ft.tarsand.

L9-207
AUG.30.1957 88

Figure 10

WELL LOG.
173 W/40 N. (B8-5)

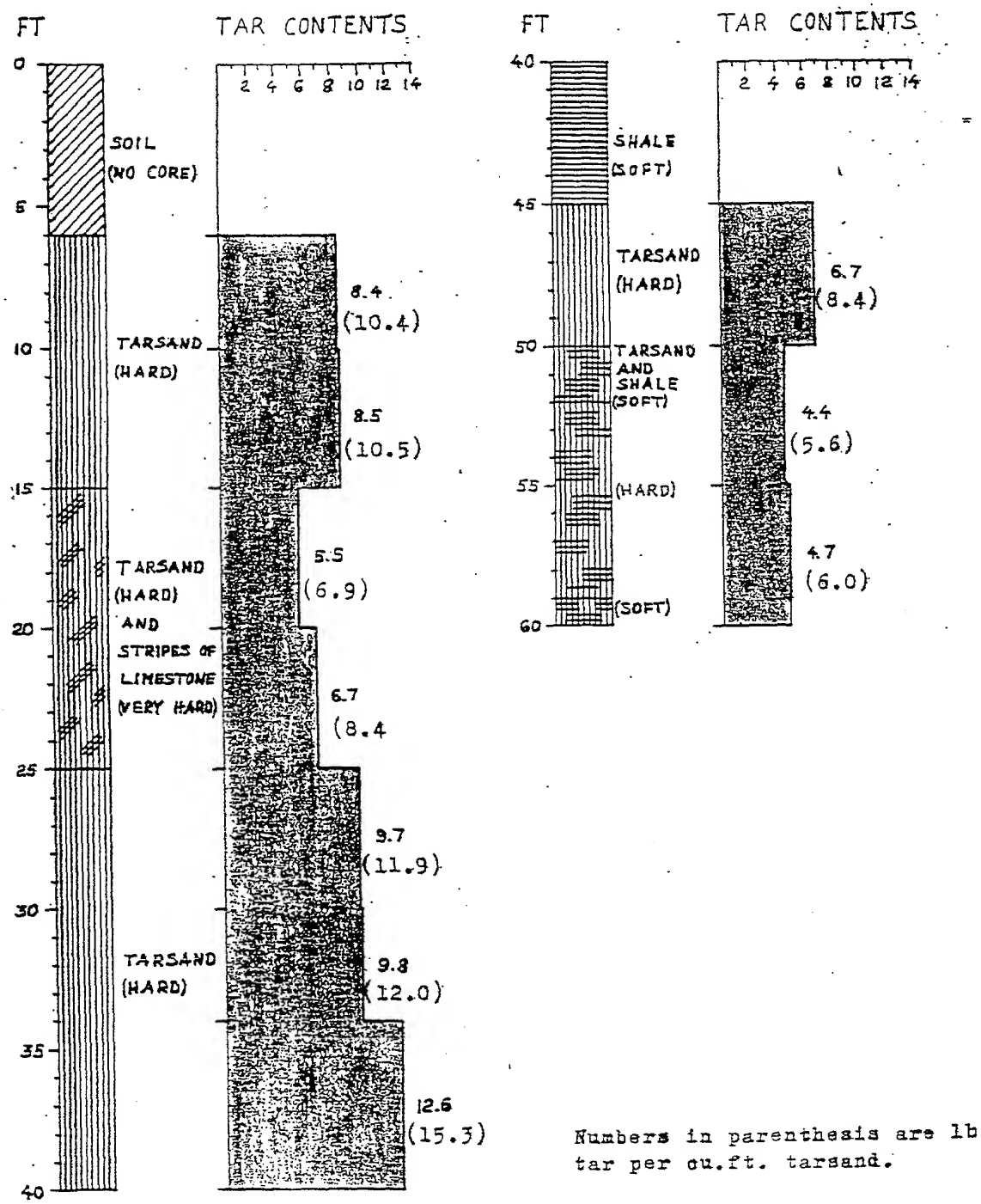


Numbers in parenthesis ar lbs tar per cu.ft. tarsand.

L9-211
OCT. 18. 1957 88

Figure 11

WELL LOG.
173 W/50 N. (B8-6)

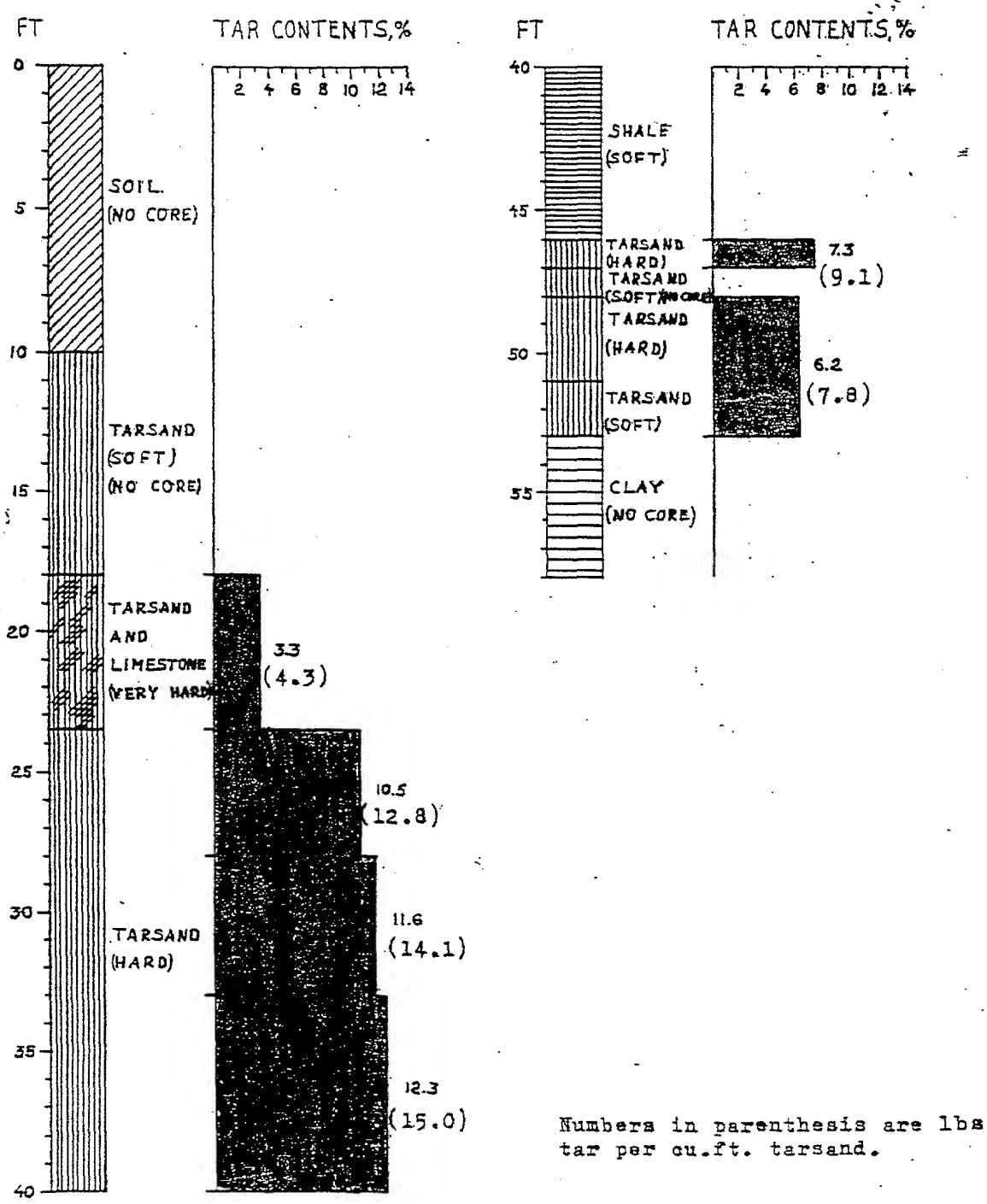


Numbers in parenthesis are lbs tar per cu.ft. tarsand.

L9-208.
OCT.18.1957 SP

Figure 12

WELL LOG.
181 W/5 N. (B9-2)

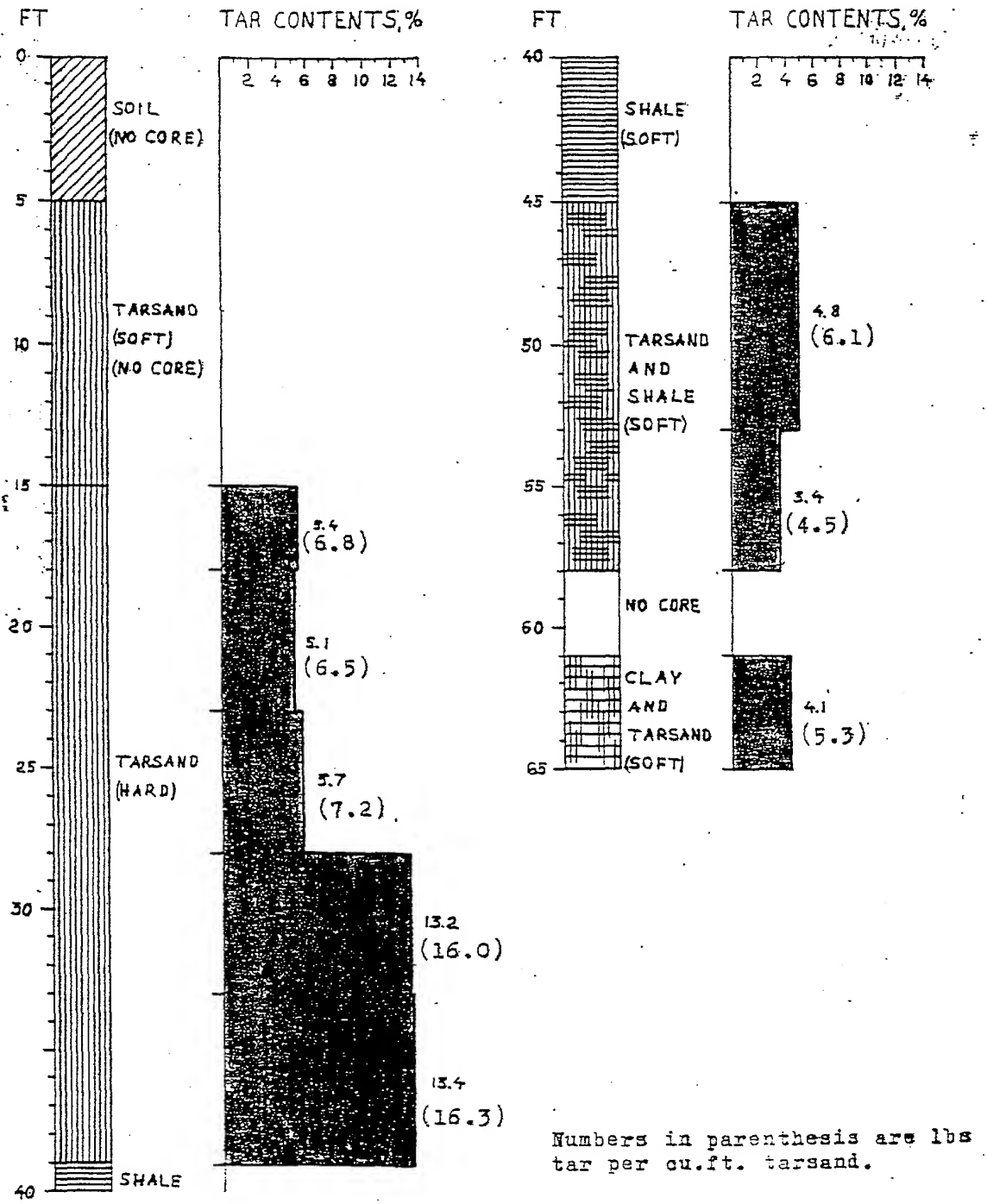


Numbers in parenthesis are lbs tar per cu.ft. tarsand.

L9-209
OCT. 18. 1957 S.P.

Figure 13

WELL LOG
181 W/75 N. (B9-9)



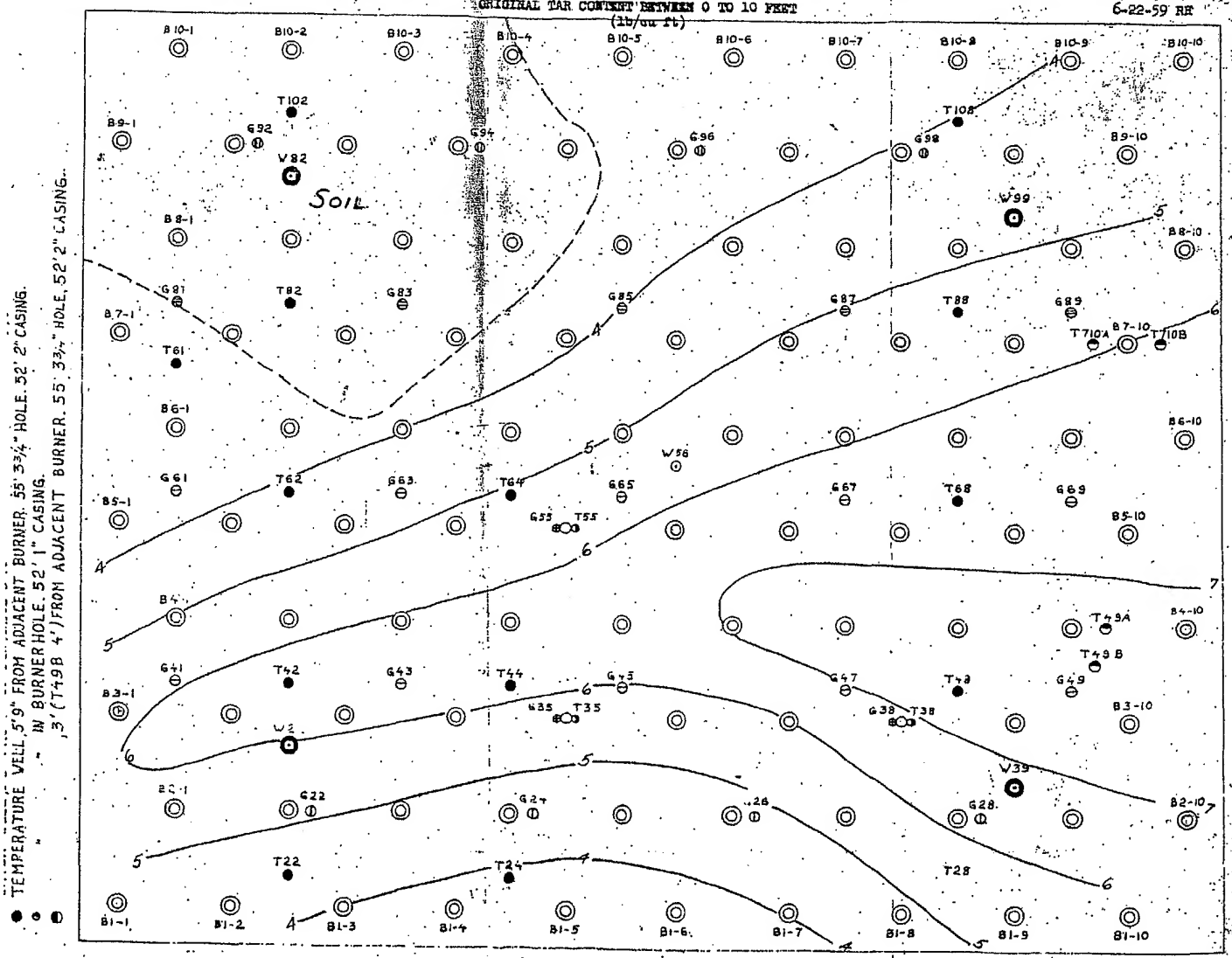
Numbers in parenthesis are lbs tar per cu.ft. tarsand.

TEMPERATURE VELL 3'9" FROM ADJACENT BURNER. 55 3/4" HOLE: 52" CASING.
IN BURNER HOLE. 52' 1" CASING
3'(T49B 4')FROM ADJACENT BURNER. 55 3/4" HOLE 52'2" CASING.
ORIGINAL TAR CONTENT BETWEEN 15 AND 45 FEET
(lbs/cu.ft.)
9
10
11
12
13

Figure 15

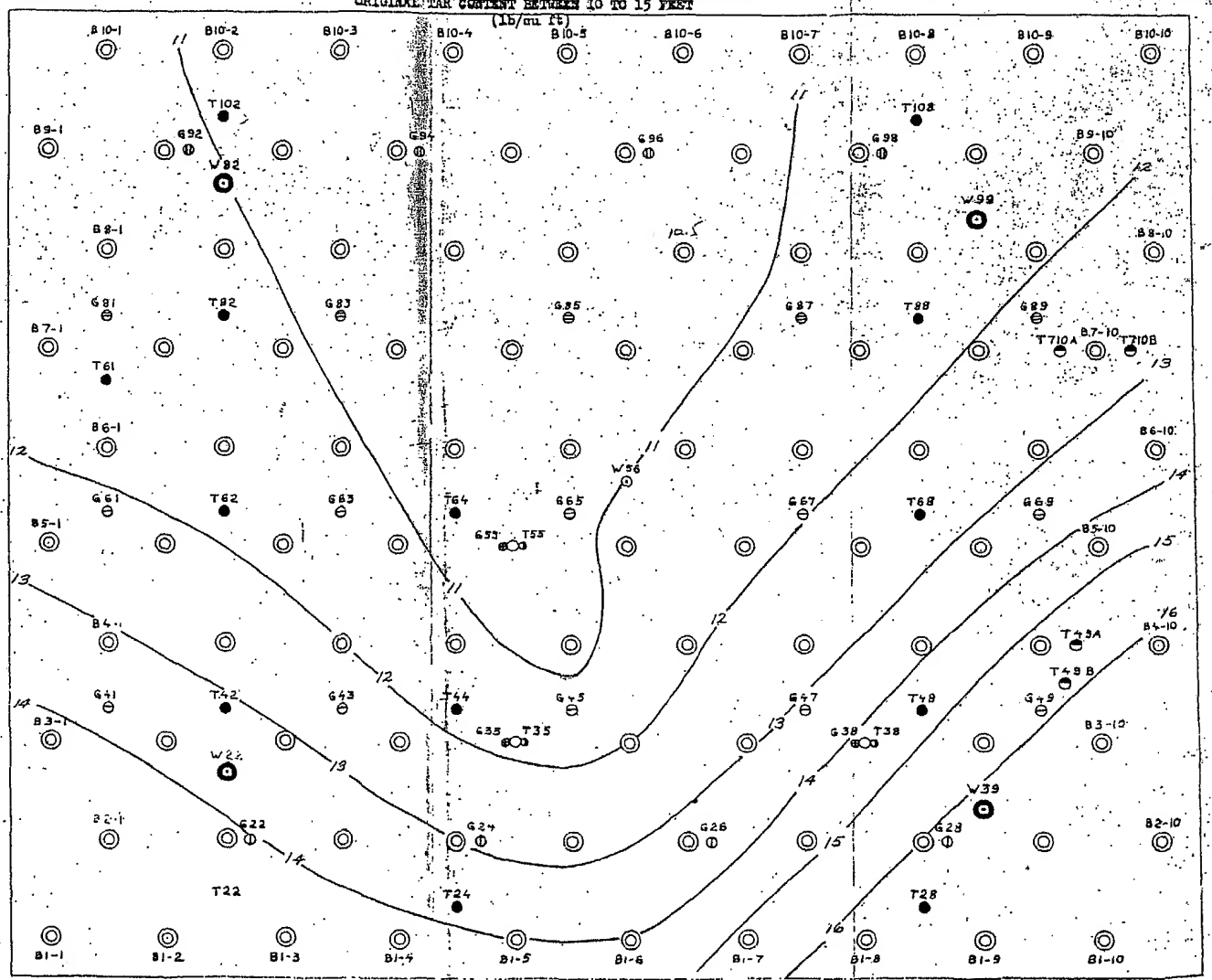
ORIGINAL TAR CONTENT BETWEEN 0 TO 10 FEET
(lb/cu ft)

19-217-2
6-22-59 RR



TEMPERATURE WELL, 5'9" FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.
" IN BURNER HOLE. 52' 1" CASING.
" 3' (T49B 4') FROM ADJACENT BURNER. 55' 3¾" HOLE, 52' 2" CASING.

Figure 16
ORIGINAL TAR CONTENT BETWEEN 10 TO 15 FEET
(lb/cu ft)

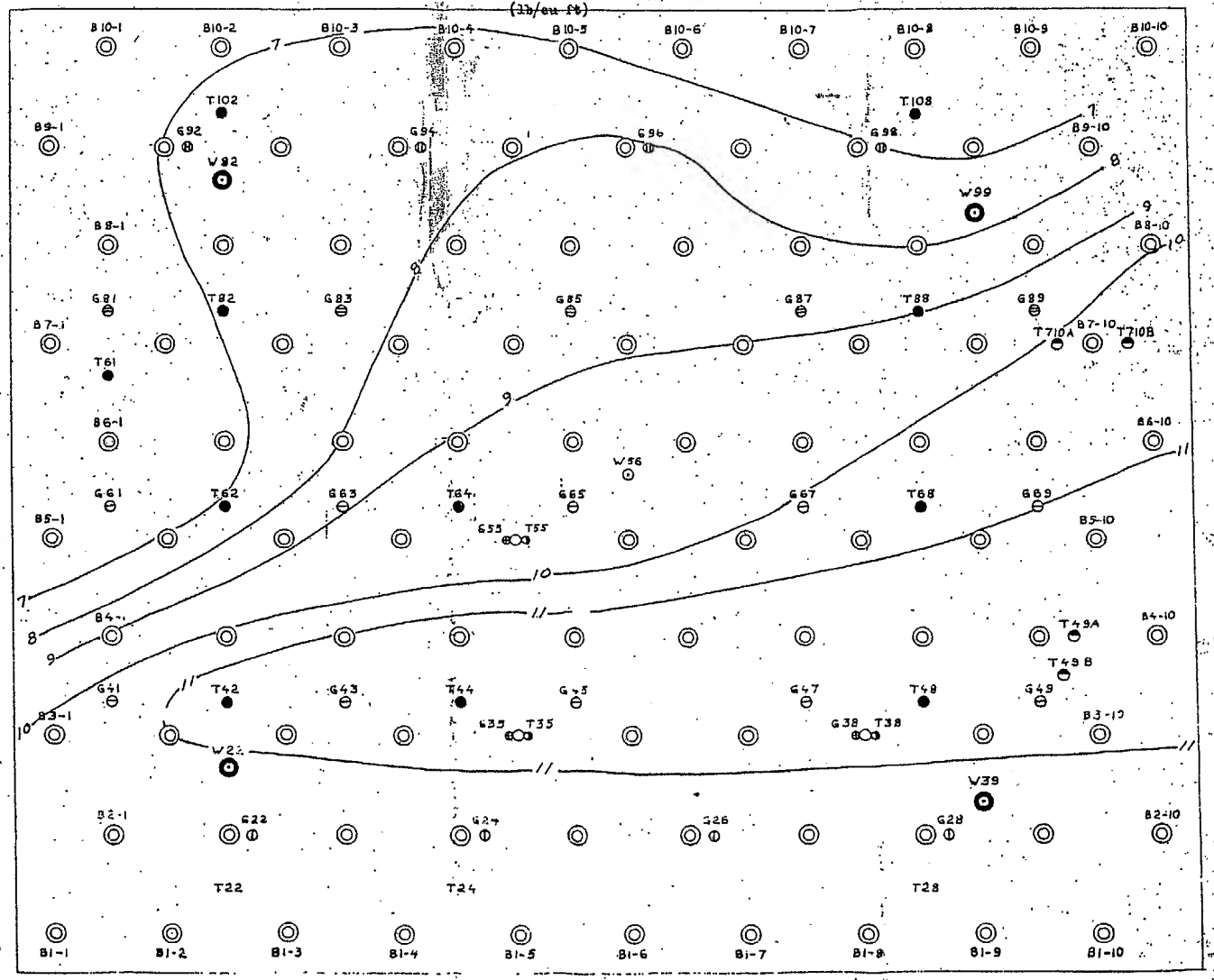


TEMPERATURE WELL, 5'9" FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.
* IN BURNER HOLE. 52' 1" CASING.
3' (T49B 4') FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.

TEMPERATURE VELL.5'9" FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.
" " IN BURNER HOLE. 52', 1" CASING.
.3'(T49B 4')FROM ADJACENT BURNER. 55' 3¾" HOLE. 52'2" CASING.
Figure 17
ORIGINAL TAR CONTENT BETWEEN 15 TO 20 FEET
(lb/cu ft)
19-217-4
6-22-59 RH

Figure 18
ORIGINAL TAR CONTENT BETWEEN 20 TO 25 FEET
(lb/cu ft)

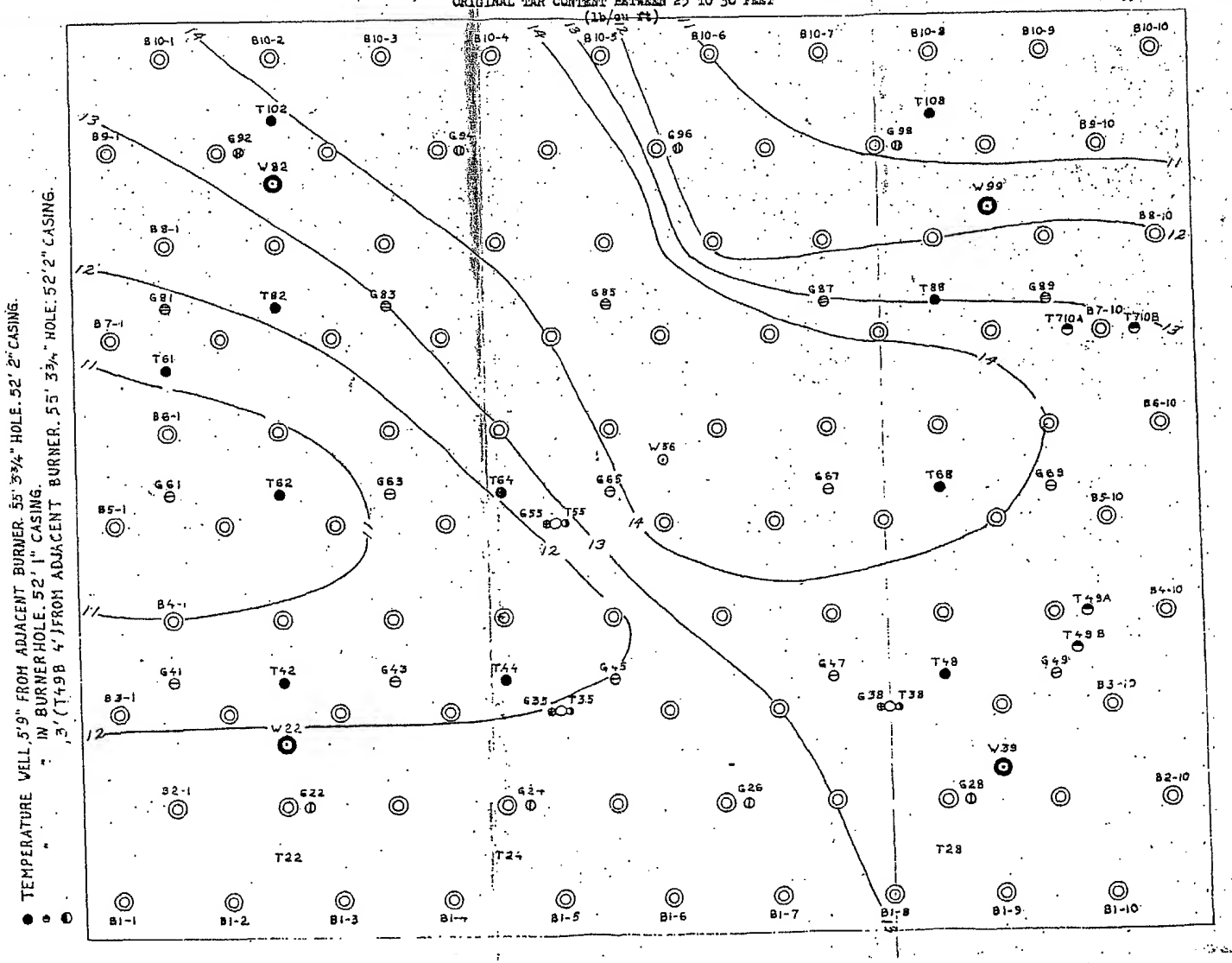
IS-217-5
6-22-59 RH



TEMPERATURE WELL, 5'9" FROM ADJACENT BURNER. 55'3¾" HOLE. 52' 2" CASING.
" IN BURNER HOLE. 52' 1" CASING.
3' (T49B 4') FROM ADJACENT BURNER. 55' 3¾" HOLE. 52'2" CASING.

Figure 19
ORIGINAL TAR CONTENT BETWEEN 25 TO 30 FEET
(lb/cu ft)

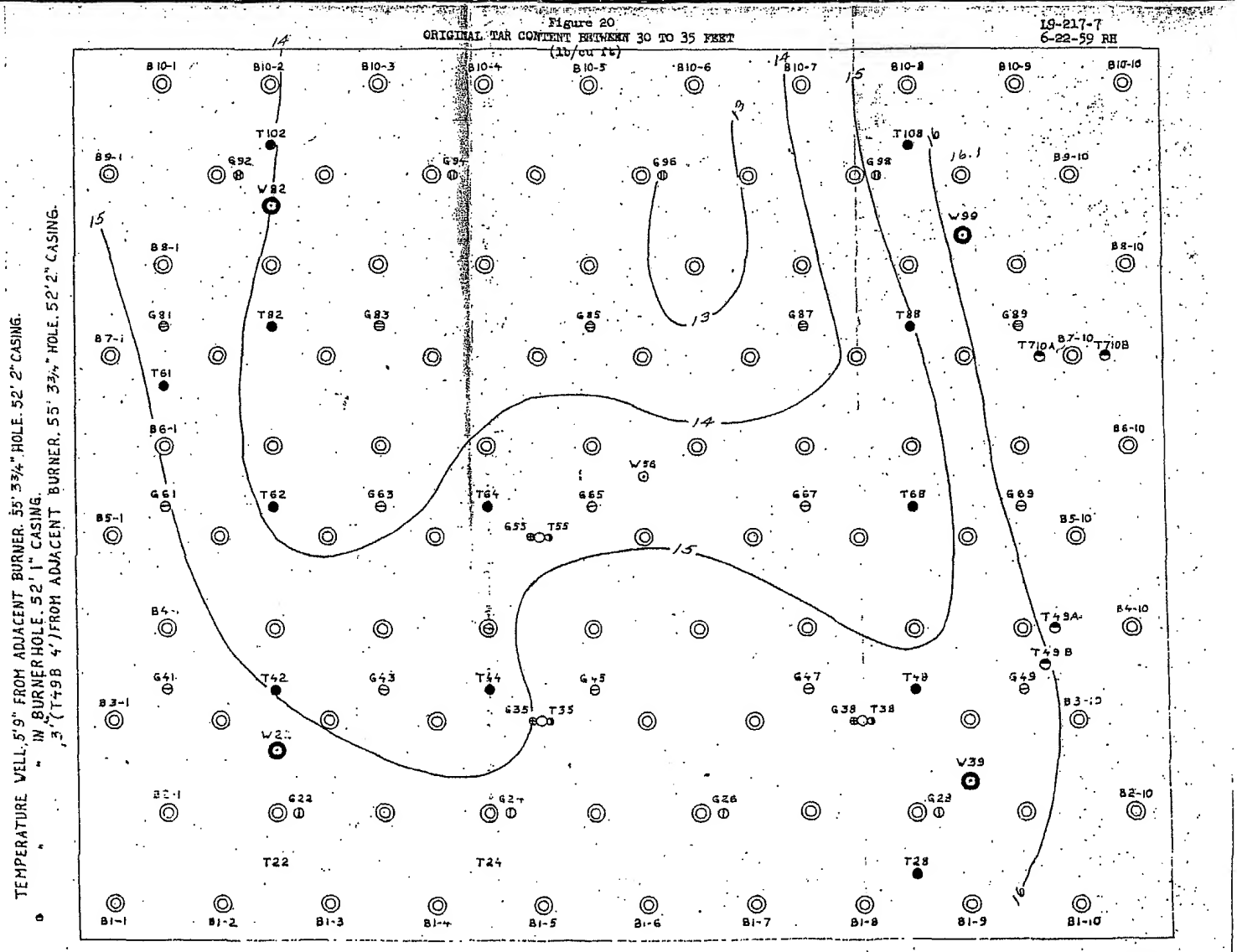
I9-217-6
6-22-59 RH



● TEMPERATURE WELL, 5'9" FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.
● " IN BURNER HOLE. 52' 1" CASING.
◐ " 3' (T49B 4') FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.

Figure 20
ORIGINAL TAR CONTENT BETWEEN 30 TO 35 FEET
(lb/cu ft)

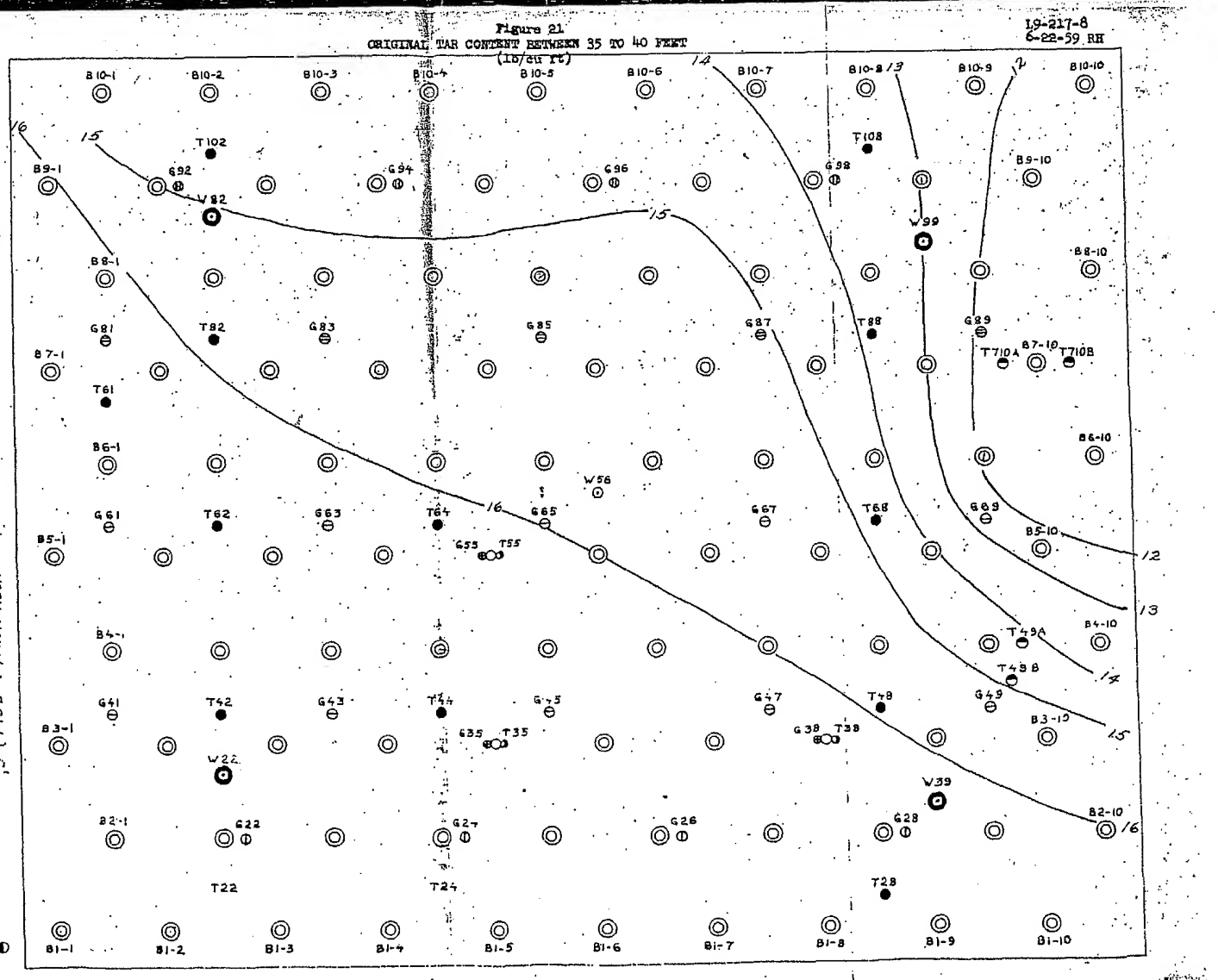
IG-217-7
6-22-59 RH



TEMPERATURE WELL, 5' 9" FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.
" IN BURNER HOLE. 52' 1" CASING.
3" (T49B 4') FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.

Figure 21
ORIGINAL TAR CONTENT BETWEEN 35 TO 40 FEET
(lb/cu ft)

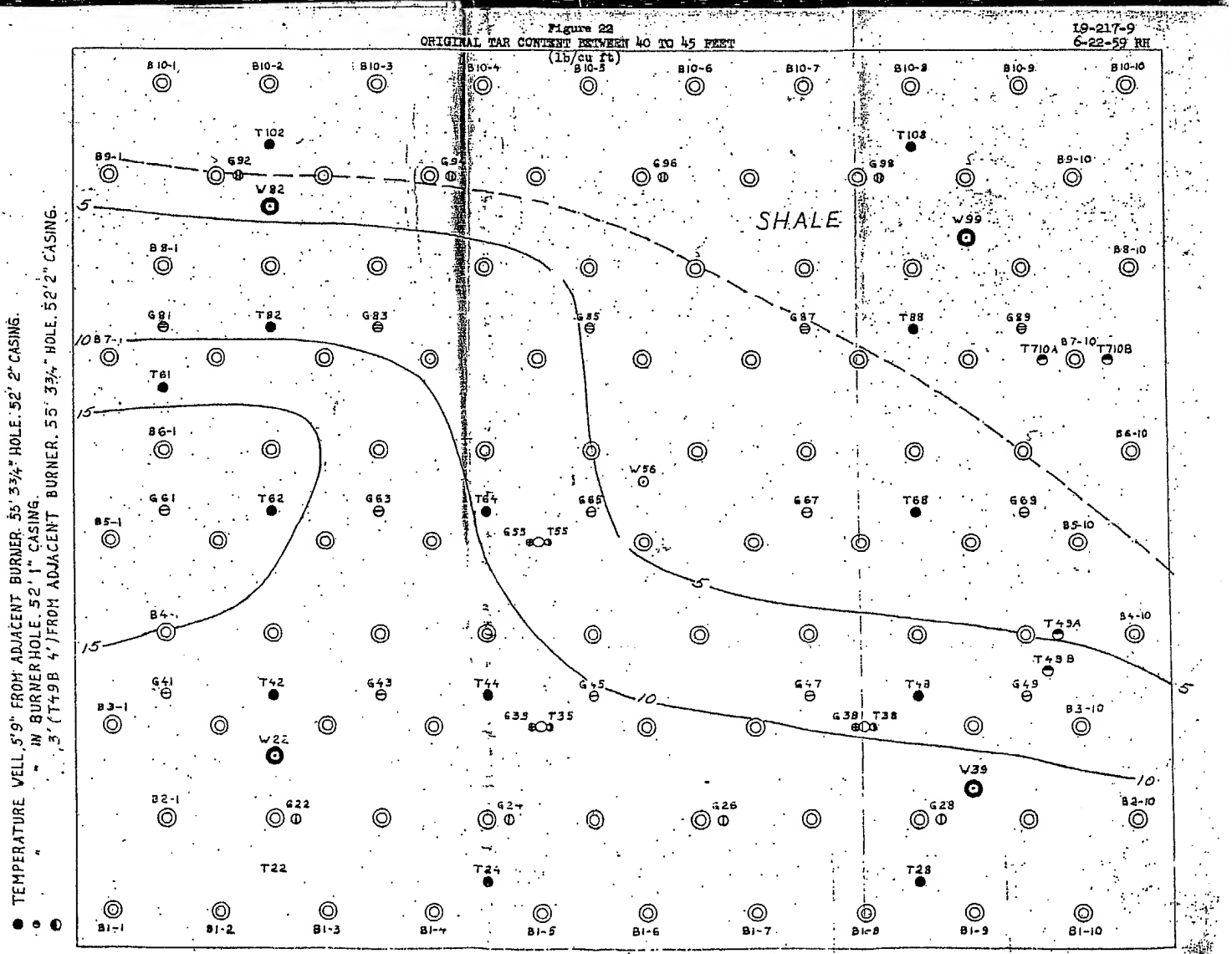
19-217-8
6-22-59 RH



TEMPERATURE WELL 5'9" FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.
" IN BURNER HOLE. 52' 1" CASING.
" 3' (T49B 4') FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.

Figure 22
ORIGINAL TAR CONTENT BETWEEN 40 TO 45 FEET
(lb/cu ft)

19-217-9
6-22-59 RH



● TEMPERATURE WELL, 5'9" FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.
● " IN BURNER HOLE. 52' 1" CASING.
● " 3' (T49B 4') FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.

Figure 23
ORIGINAL TAR CONTENT BETWEEN 45 TO 55 FEET
(by wt %)
5-22-59 NE
TEMPERATURE WELL 5'9" FROM ADJACENT BURNER. 55'-3¾" HOLE. 52' 2" CASING.
IN BURNER HOLE. 52', 1" CASING.
3'(T49B 4')FROM ADJACENT BURNER. 55' 3¾" HOLE. 52'2" CASING.

HOLE PATTERN OF TEST L9.

L9-101.
JAN. 21. 1958. BP
REVISED 3.15.58. AP

- ○ BURNER. 15' 5⅝" AND 40' 4¾" HOLE. 52' 2½" CASING.
- ◎ CONCENTRIC GASWELL AROUND BURNER. 13' 4.50"-4.22" CASING.
- ⊕ SEPARATE GASWELL IN BURNERHOLE. 15' 1½" CASING.
- ⊖ " " 2' FROM ADJACENT BURNER. 20' 3¾" HOLE. 15' 1½" CASING.
- ⊖ " " 5'9" " " " " " " " " "
- ⊜ " " 2' " " " 50' 3¾" HOLE FILLED WITH GRAVEL TO 15'. 15' 1½" CASING.
- ⊜ " " 5'9" " " " " " " " " "
- ◎ CONCENTRIC GASWELL AROUND WATER WELL. 15' 4.50"-4.22" CASING.
- ⊙ WATER WELL, 5'9" FROM ADJ. BURNER. 55' 5⅝" HOLE. 50' 1½" TUBING. W56: 75' 5⅝" HOLE. 40' 3½" AND 10' 4" TUBING.
  TEMPERATURE WELL, 5'9" FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.
- ● " " IN BURNERHOLE. 52' 1" CASING.
- ● ,3' (T49B 4') FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.

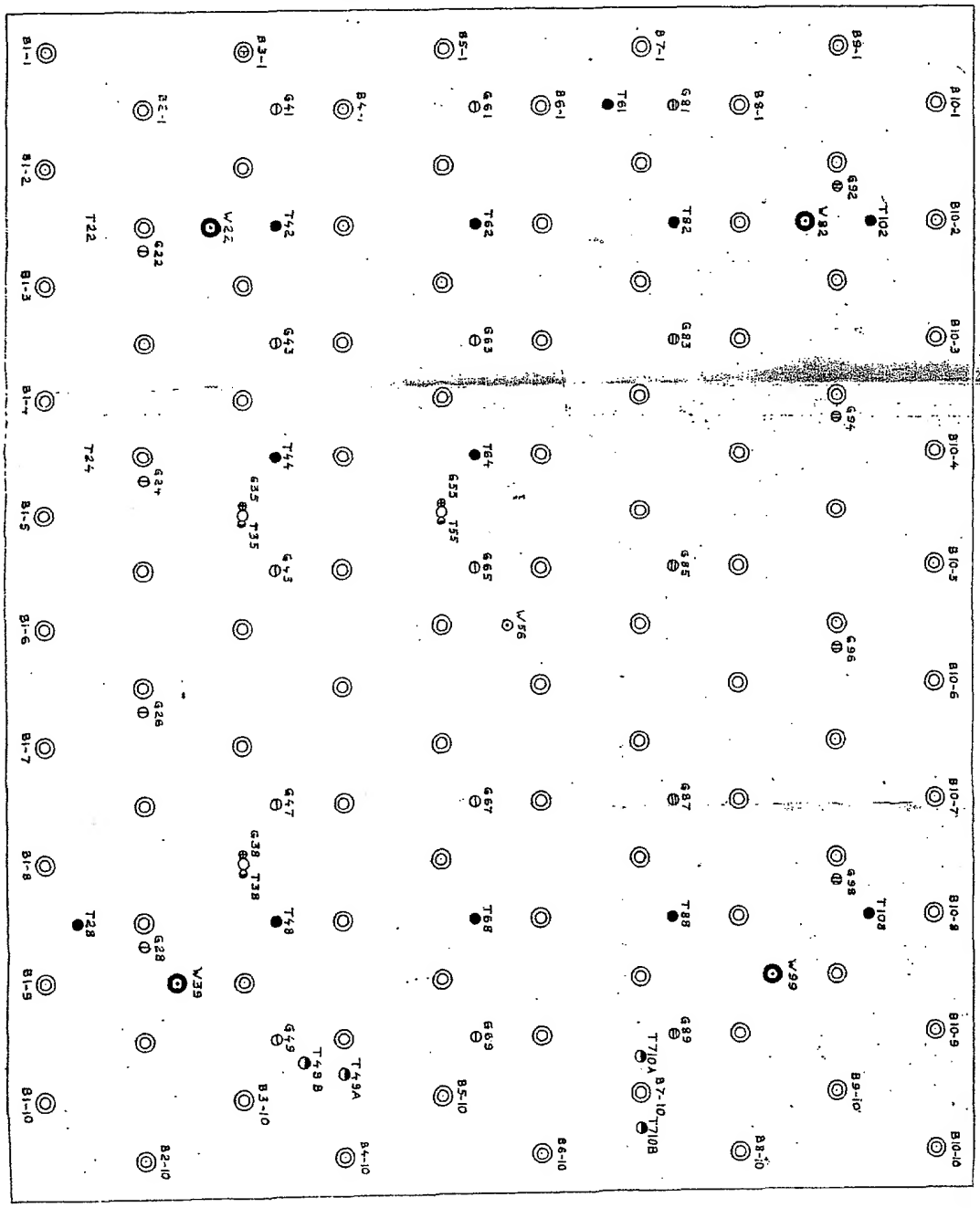


Figure 24

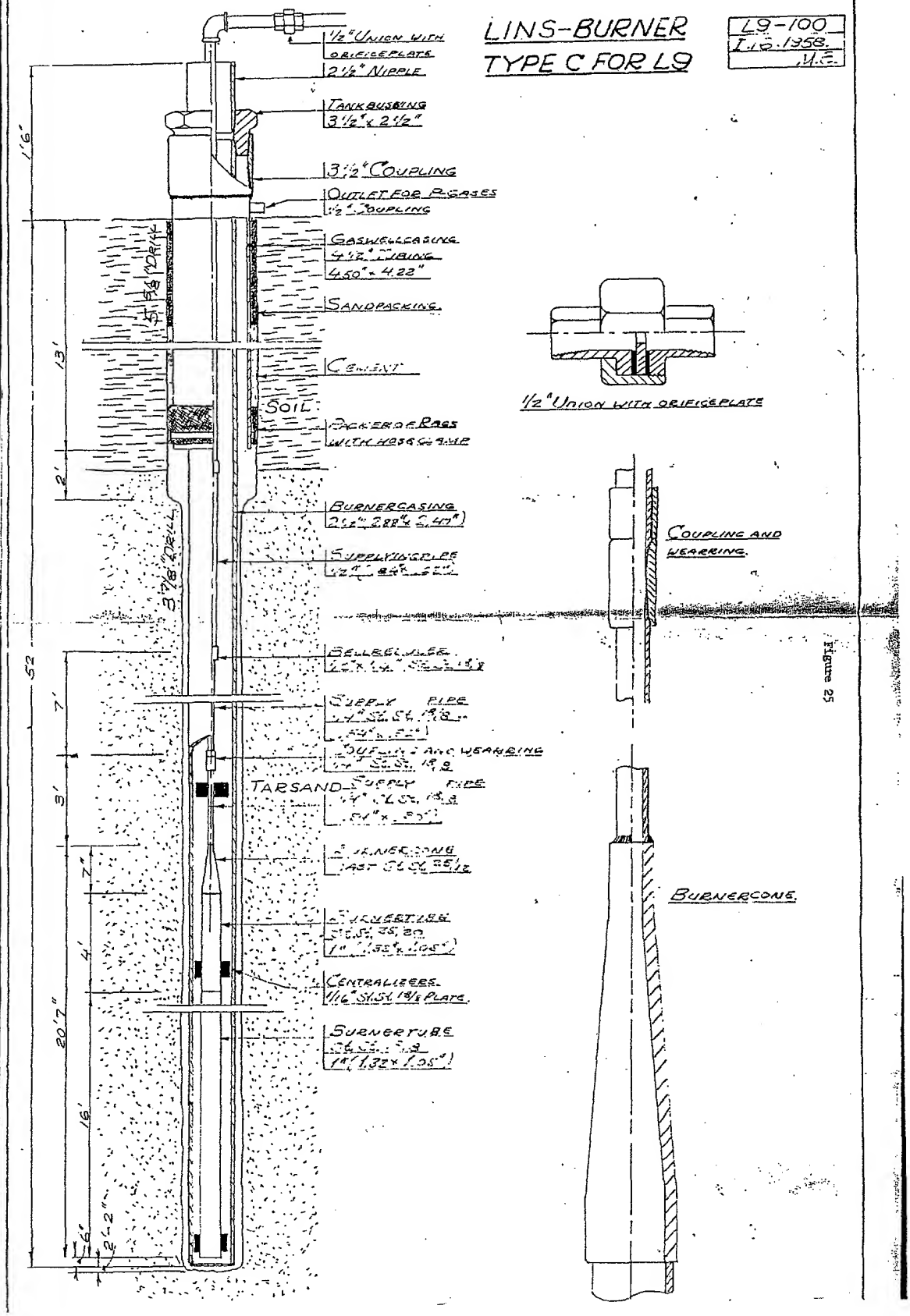
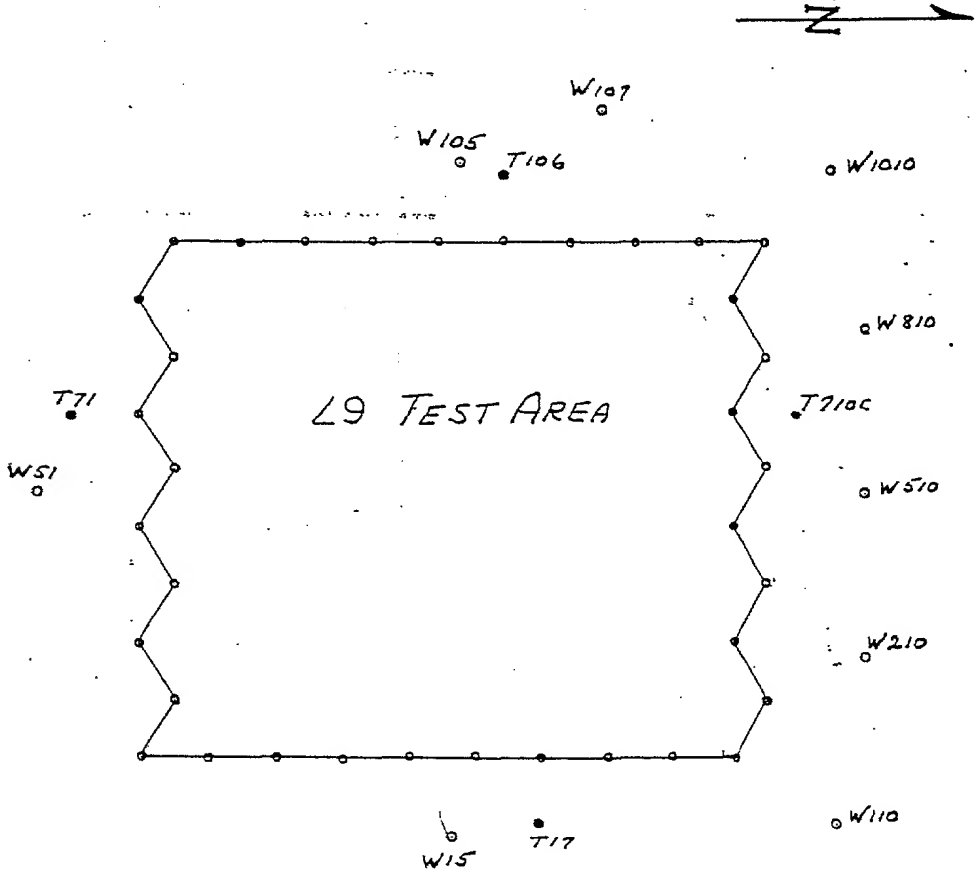

LINS-BURNER
TYPE C FOR L9
L9-100
I.I.D. 1958.
U.S.
1/2" Union with orificeplate
2 1/2" Nipple
Tank bushing
3 1/2" x 2 1/2"
3 1/2" Coupling
Outlet for P-gases
1/2" Coupling
Gaswellcasing
4 1/2" Tubing
4.50" - 4.22"
Sandpacking
Cement
Soil
Packer of Rags
Burnercasing
Supplying pipe
Bellcel valve
Supply pipe
Tarsand
Burnercone
Centralizers
1/16" St.St. 18/8 Plate.
Surgetube
1/2" Union with orificeplate
Coupling and wearring.
Burnercone
16'
13'
2'
52
7'
3'
4'
2'
20'7"
16'
3 7/8" Drill
Figure 25

Figure 27

WATER WELLS AND TEMPERATURE WELLS OUTSIDE L9.



Well, No.	Location.
W15,105	12 feet outside the edge of the field.
W51,105,110,210	15 " " " " " " "
W510,810,1010	15 " " " " " " "
W107	20 " " " " " " "
T17	10 " " B1-7.
T71	10 " " B7-1.
T710C	10 " " B7-10
T106	10 " " B10-6

1960. III.12. M.E.

F-, P- AND R-LINES OF TEST L9.

L9-102
JAN. 24 1958. BP

F-LINE, 3."
F-LINE, 2."
P-LINE, 2."
P-LINE, 1."
R-LINE, 1."
1/2" PIPE.

HOLE SYMBOLS ACCORDING TO L9-101.

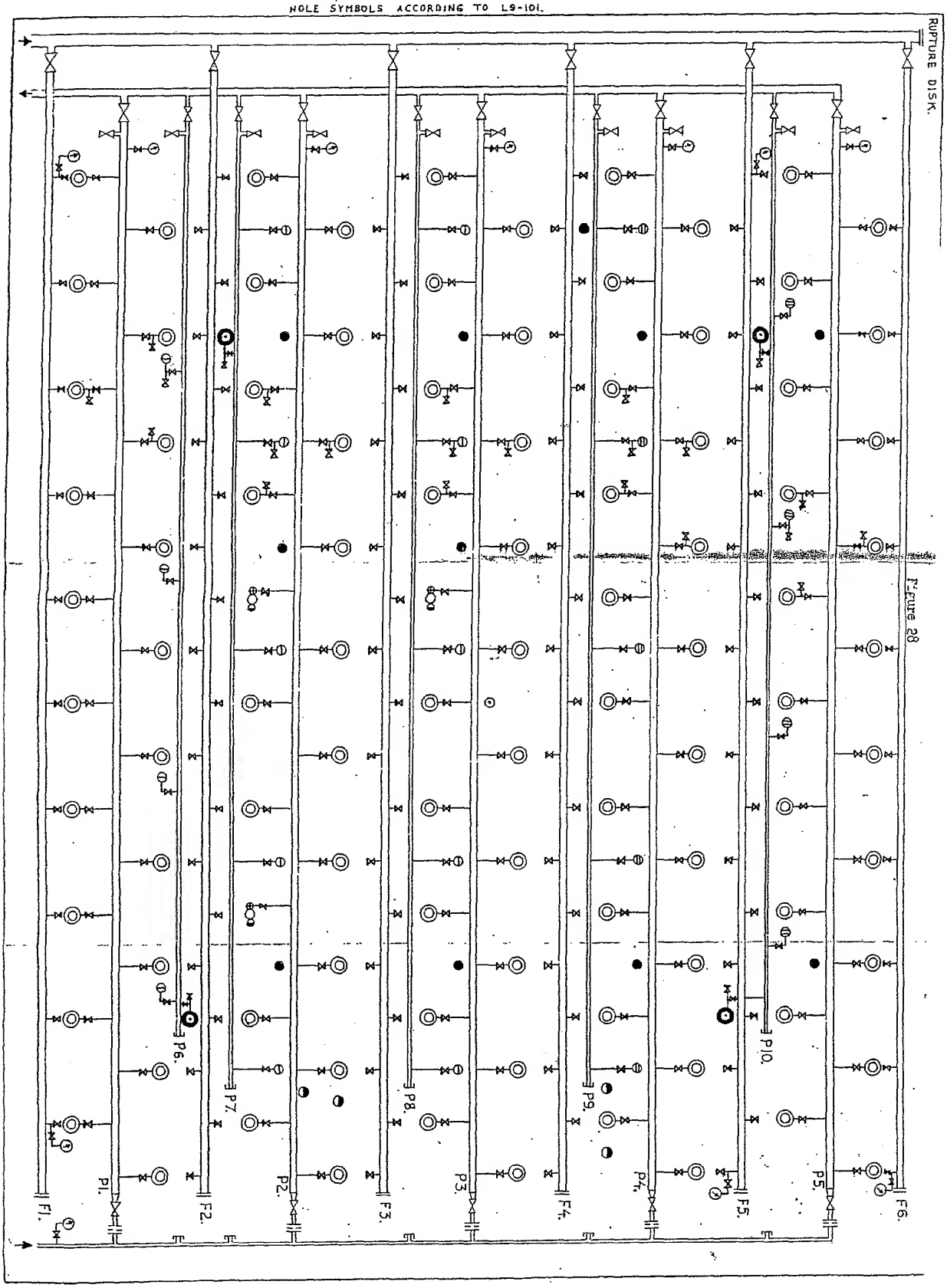


Figure 28

Figure 29

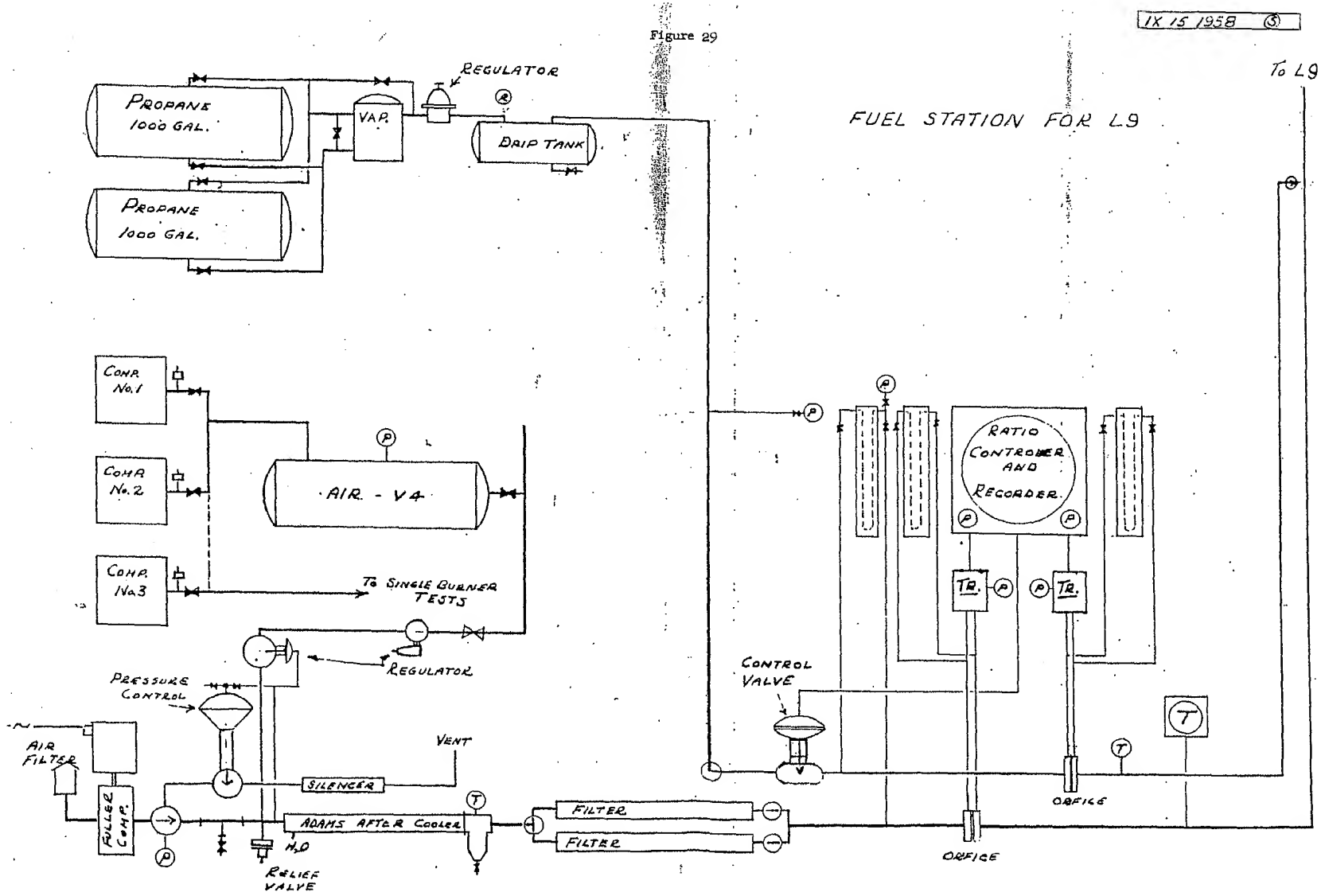
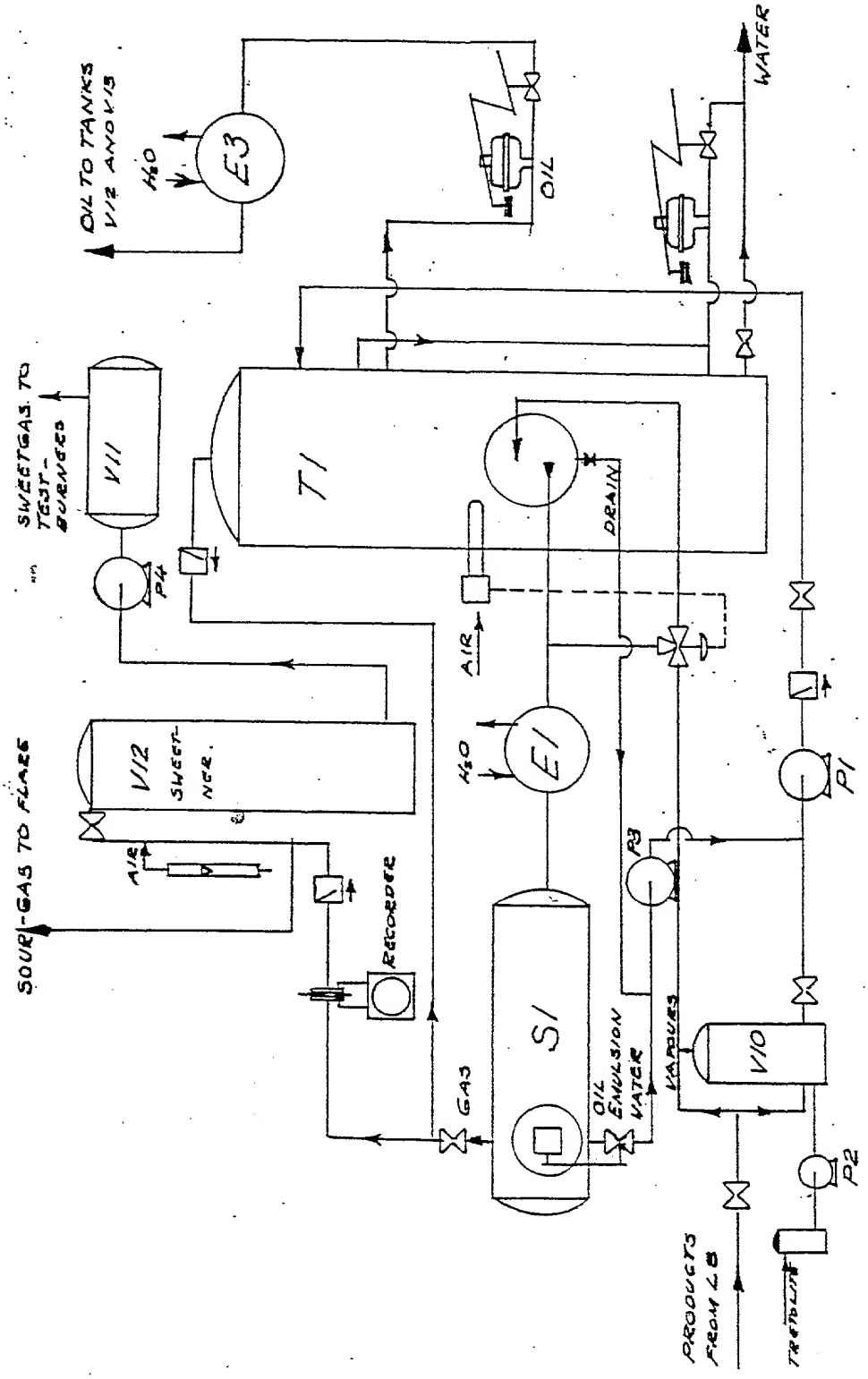

IX 15 1958 (3)
To L9
FUEL STATION FOR L9
REGULATOR
PROPANE 1000 GAL.
VAP.
DRIP TANK
PROPANE 1000 GAL.
COMP. No. 1
COMP. No. 2
COMP. No. 3
AIR - V4
To SINGLE BURNER TESTS
REGULATOR
PRESSURE CONTROL
AIR FILTER
FILLER COMP.
VENT
SILENCER
ADAMS AFTER COOLER
H2O
RELIEF VALVE
FILTER
FILTER
CONTROL VALVE
RATIO CONTROLLER AND RECORDER
TR.
TR.
ORFICE
ORFICE

Figure 30

PRODUCT STATION FOR L8A

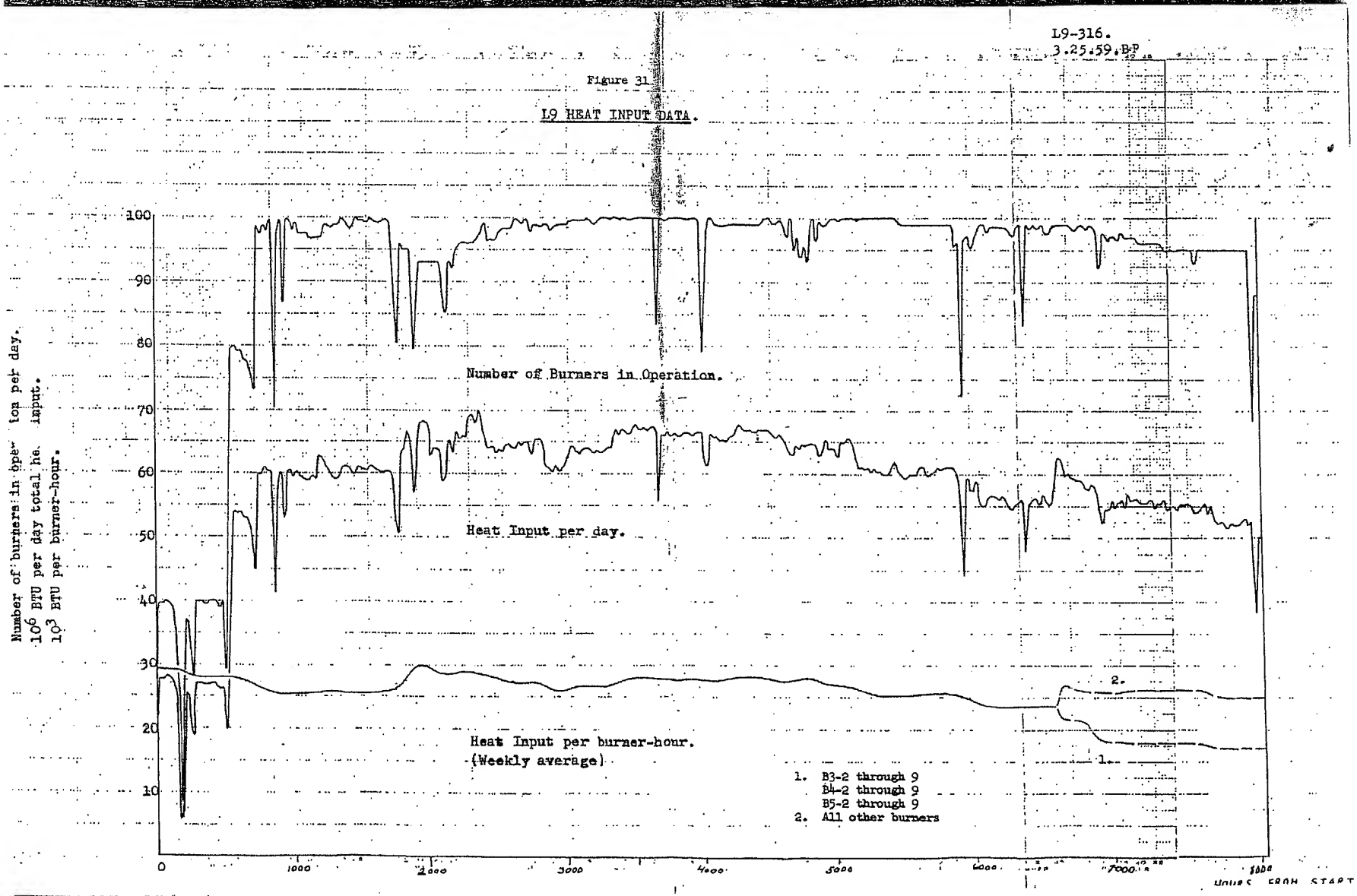
L8 - 110
10-16-1957



L9-316.
3.25.59.BP

Figure 31

L9 HEAT INPUT DATA.



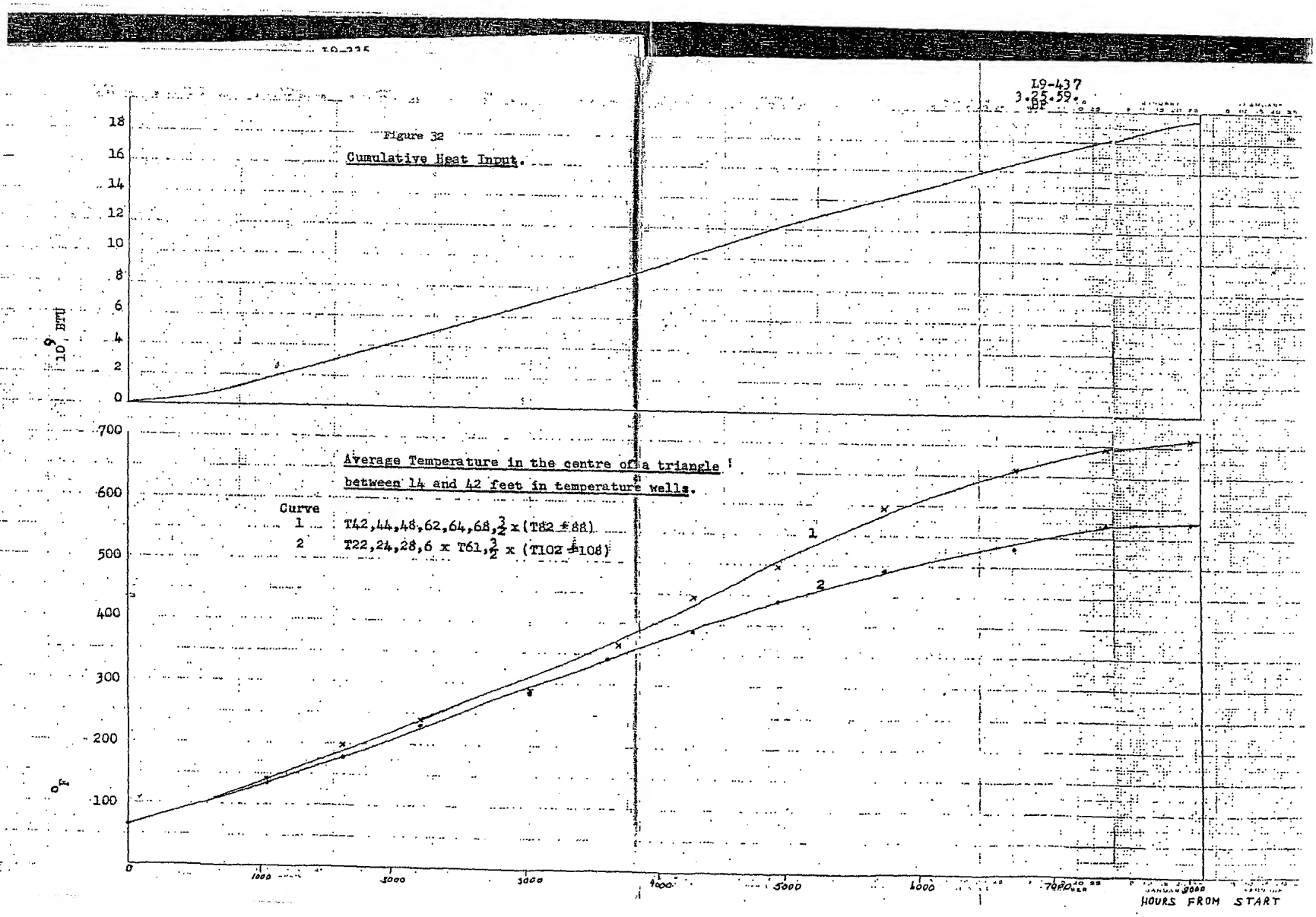


Figure 32

Cumulative Heat Input.

Average Temperature in the centre of a triangle between 14 and 42 feet in temperature wells.

Curve

1 T42,44,48,62,64,68,$\frac{3}{2}$ x (T82 + 88)

2 T22,24,28,6 x T61,$\frac{3}{2}$ x (T102 + 108)

L9-335.
4.16.59.BP.

Figure 33
Sandloss in L9 Burners.

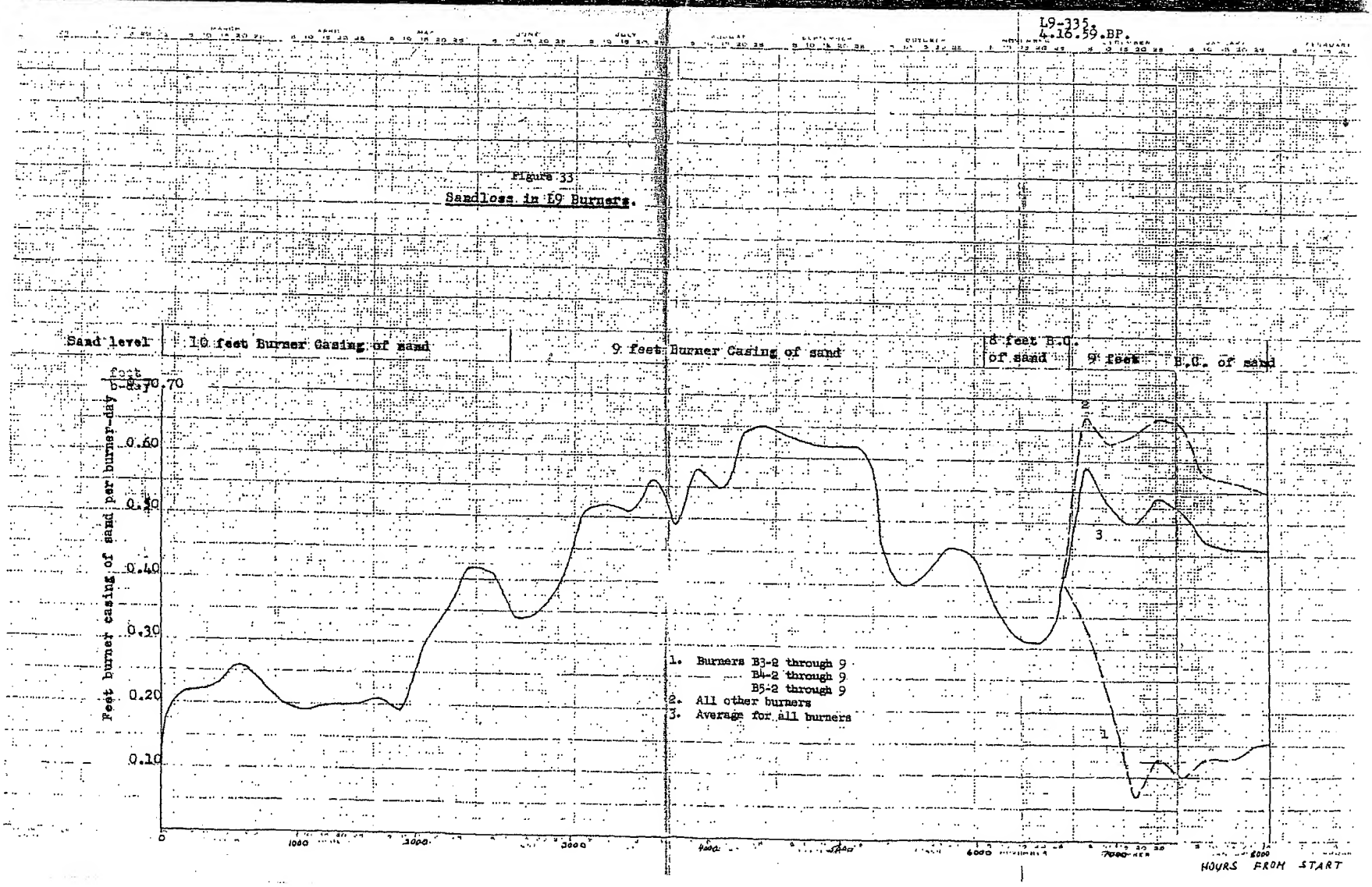


Figure 34

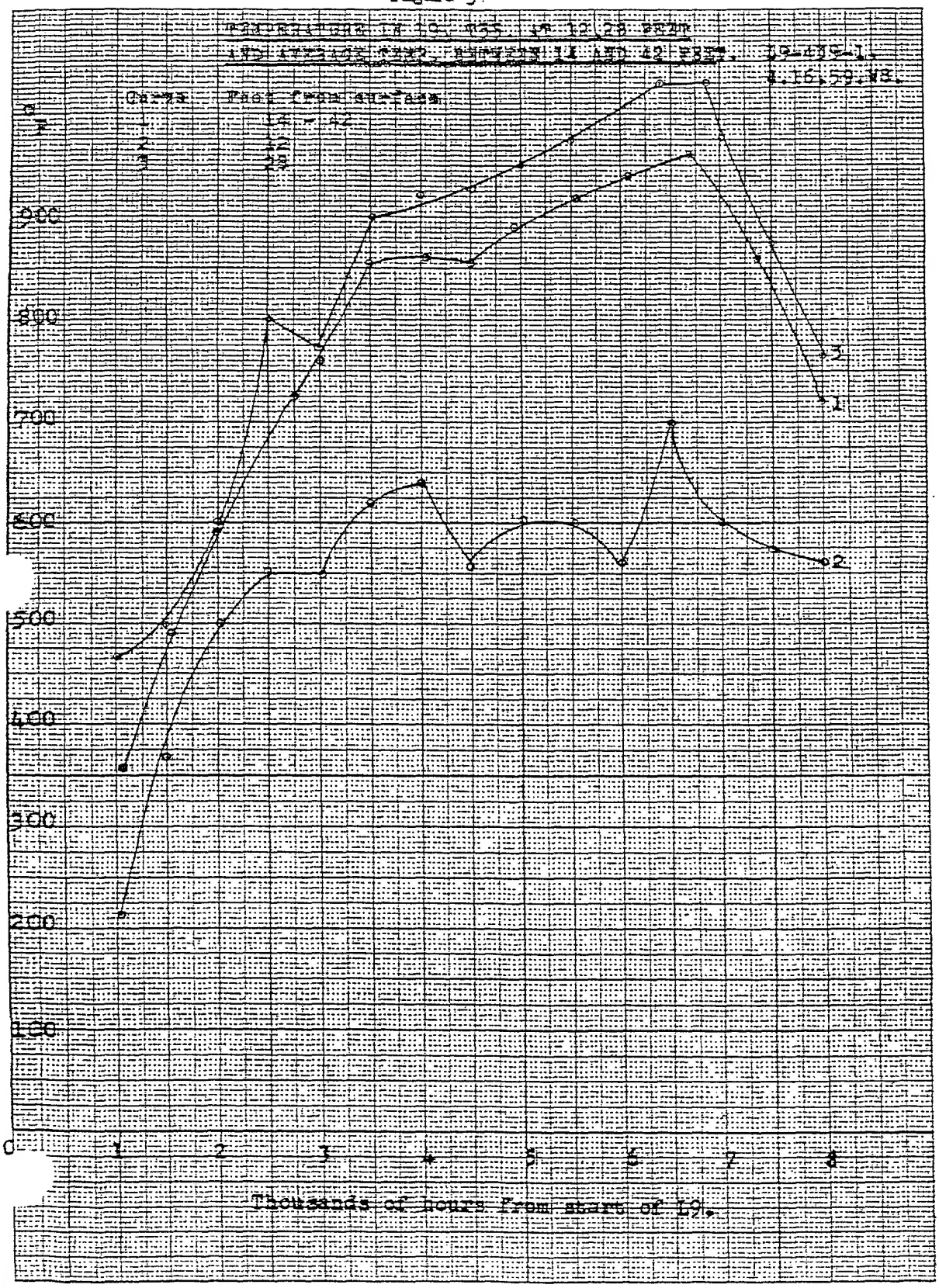
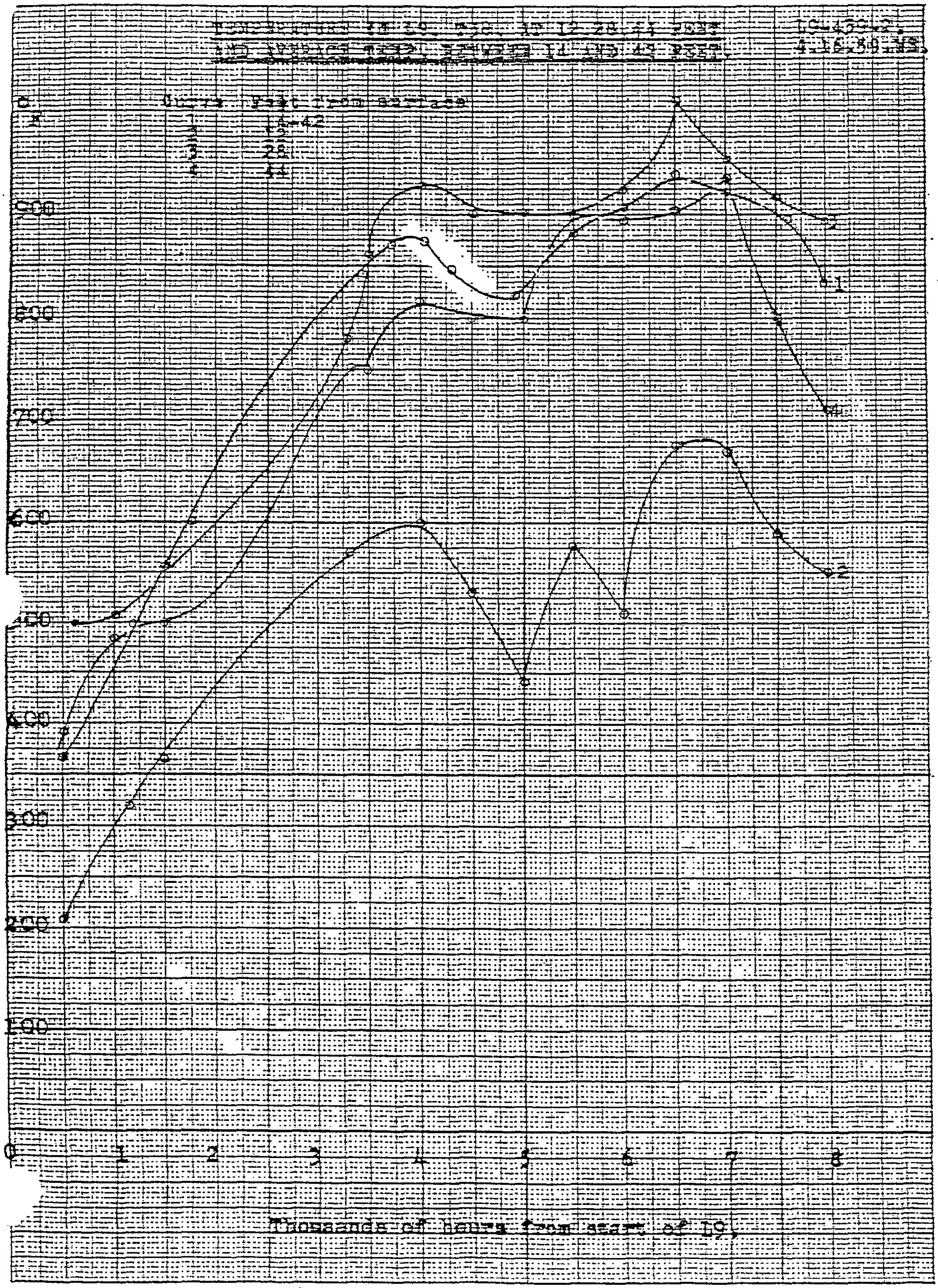

Curve
Pass from surface
14 - 42
29 - 42
900
800
700
600
500
400
300
200
100
0
1
2
3
4
5
6
7
8
Thousands of hours from start of L9.

Figure 35



C.
Curve Feet from surface
1 14-42
3 28
4 44
900
800
700
600
500
400
300
200
100
0
1
2
3
4
5
6
7
8
Thousands of hours from start of L9.

Figure 36

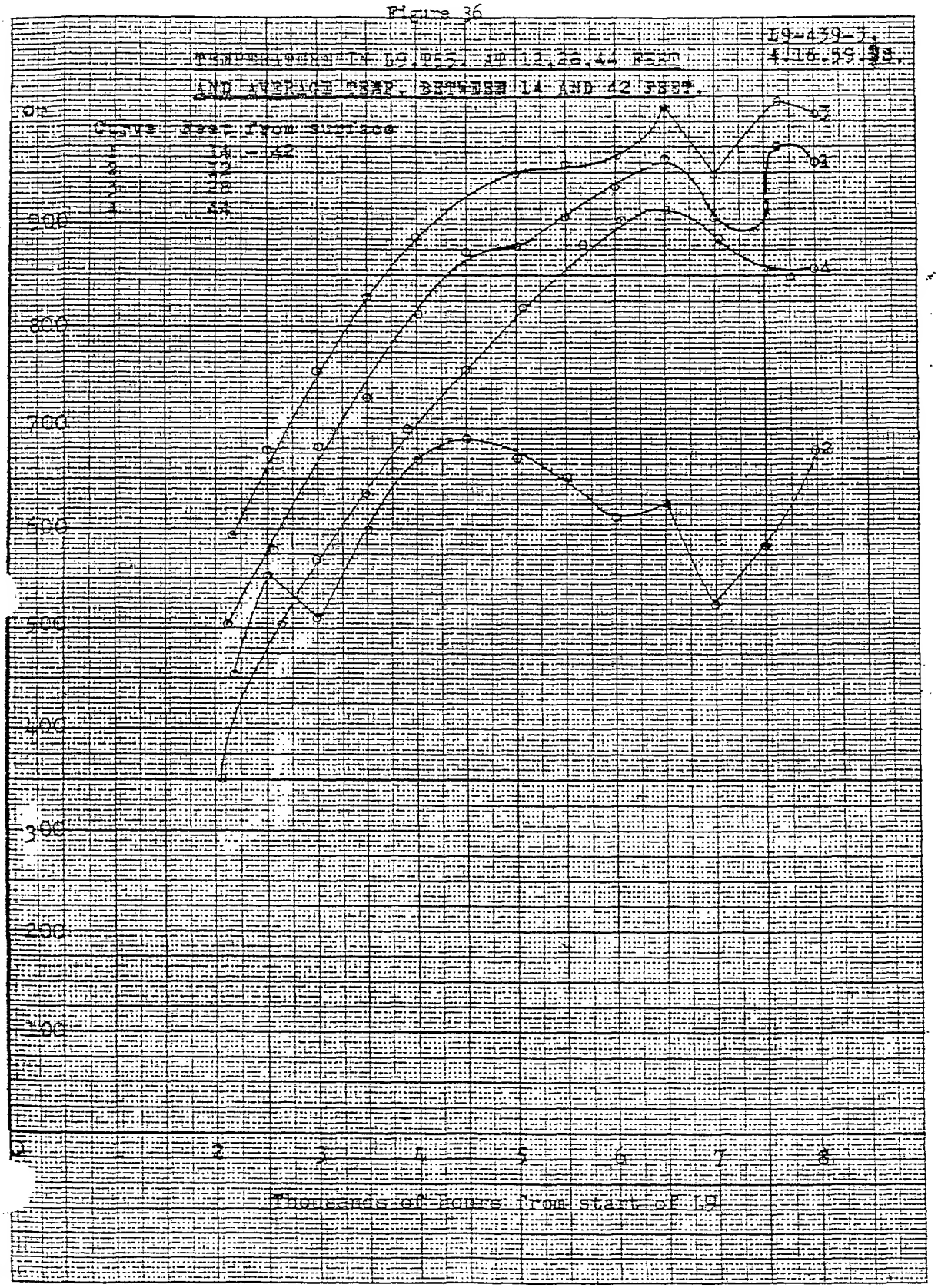

L9-439-1,
4-18-59-38.
TEMPERATURES IN DS, DS2, AT 12,28,44 FEET
AND AVERAGE MAY, BETWEEN 14 AND 42 FEET.
Curve Feet From surface
1 14 - 42
2 32
3 28
4 44
D1
D2
D3
D4
900
800
700
600
500
400
300
200
100
0
1
2
3
4
5
6
7
8
Thousands of hours from start of L9

Figure 37

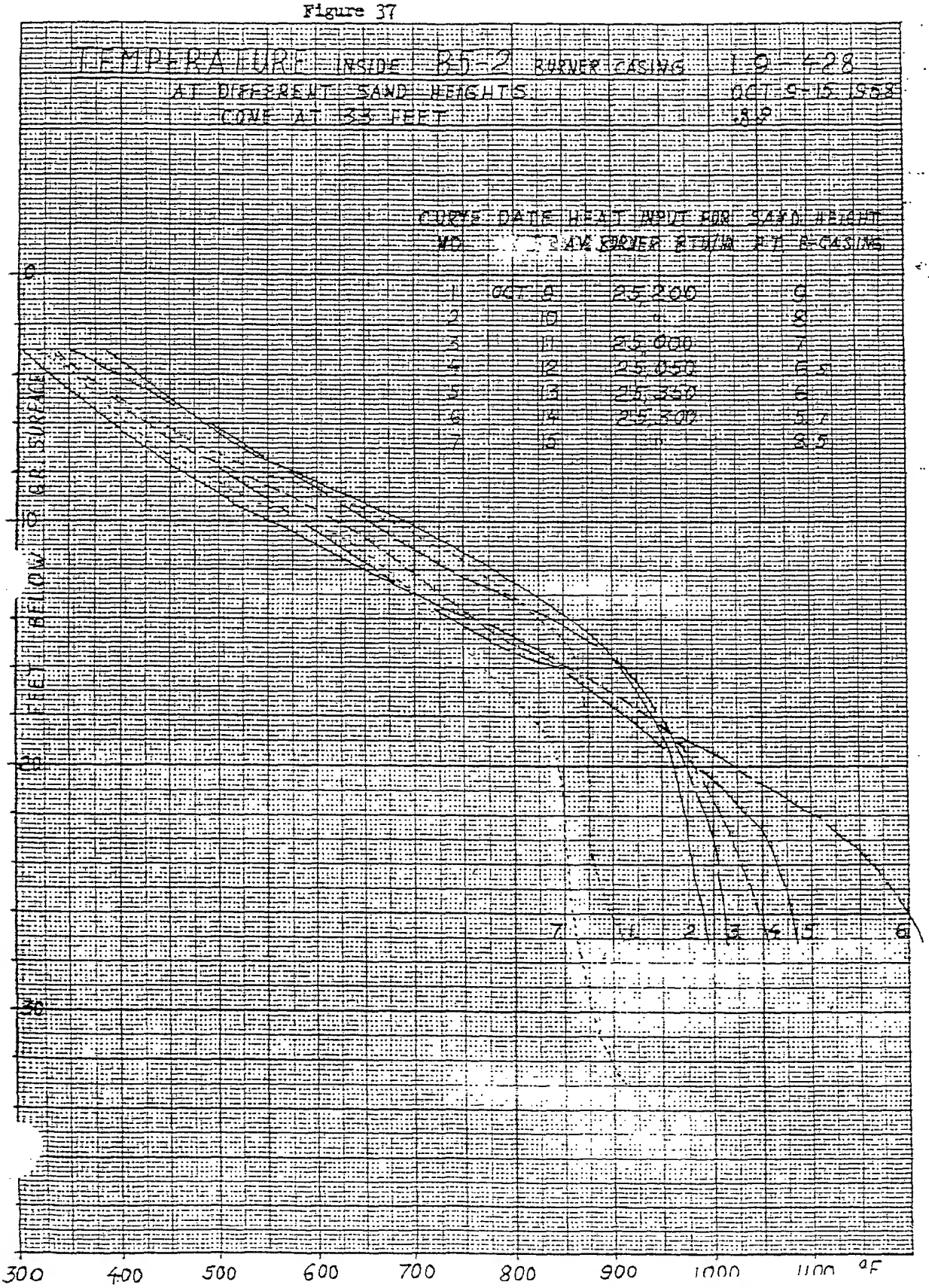

TEMPERATURE INSIDE B5-2 BURNER CASING 1-9-68
AT DIFFERENT SAND HEIGHTS OCT 9-15 1968
CONE AT 33 FEET
CURVE DATE HEAT INPUT FOR SAND HEIGHT
NO. OF DAY BURNER RETURN FT IN B-CASING
1 OCT 9 25,200 9
2 10 " 8
3 11 25,000 7
4 12 25,050 6.5
5 13 25,350 6
6 14 25,300 5.7
7 15 " 3.5
FEET BELOW GR SURFACE
300
400
500
600
700
800
900
1000
1100
°F

Figure 38

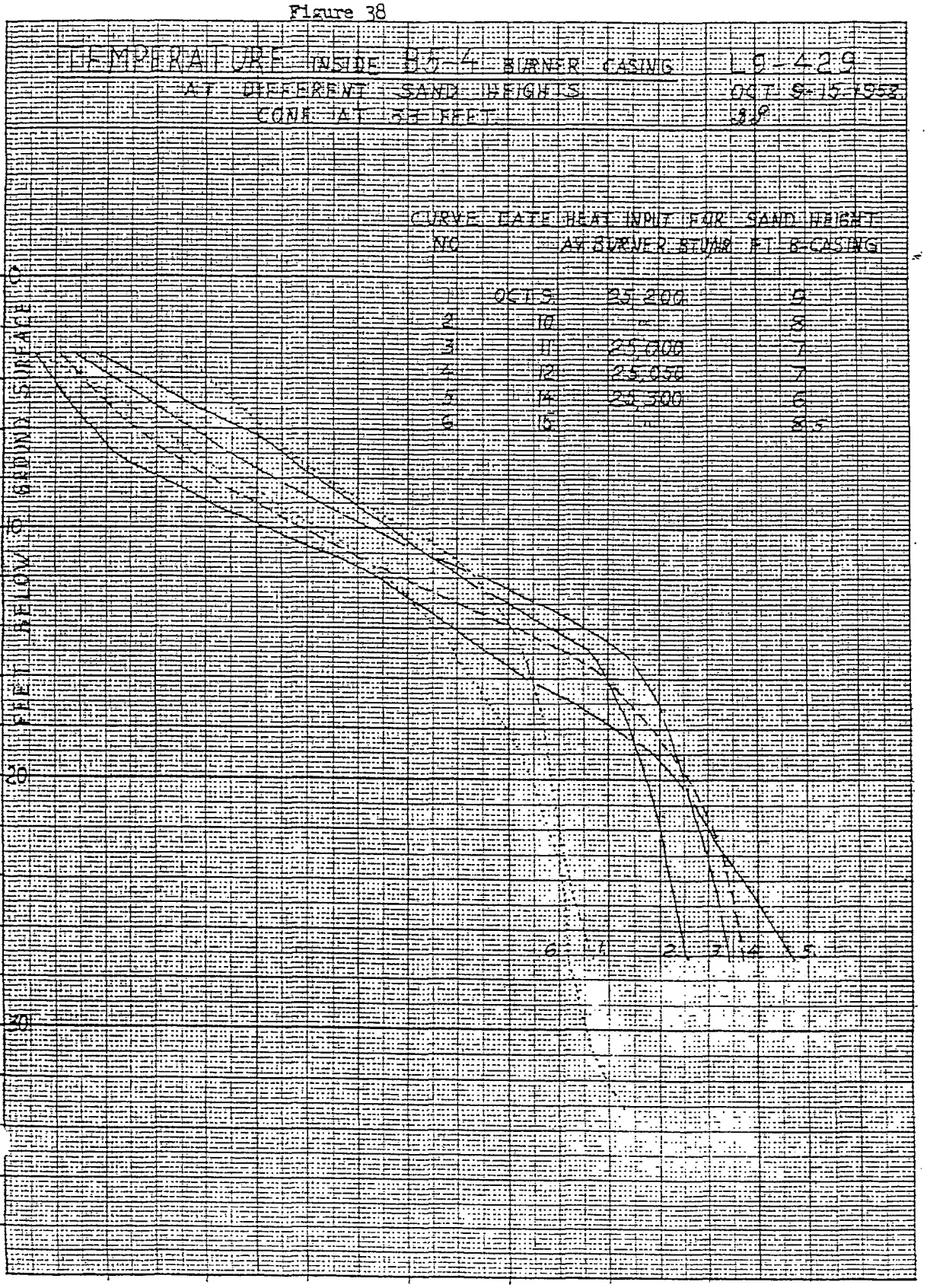

TEMPERATURE INSIDE B-W-4 BURNER CASING
AT DIFFERENT SAND HEIGHTS
CONE AT 58 FEET
L-9-429
OCT 9-15-1958
39
CURVE NO.
DATE
HEAT INPUT FOR SAND HEIGHT
AV BURNER STUDS
FT B-CASING
OCT 9
25,200
9
10
8
11
25,000
7
12
25,050
7
14
25,300
6
15
8.5
FEET BELOW GROUND SURFACE
0
10
20
30
6
7
2
3
4
5

Figure 39

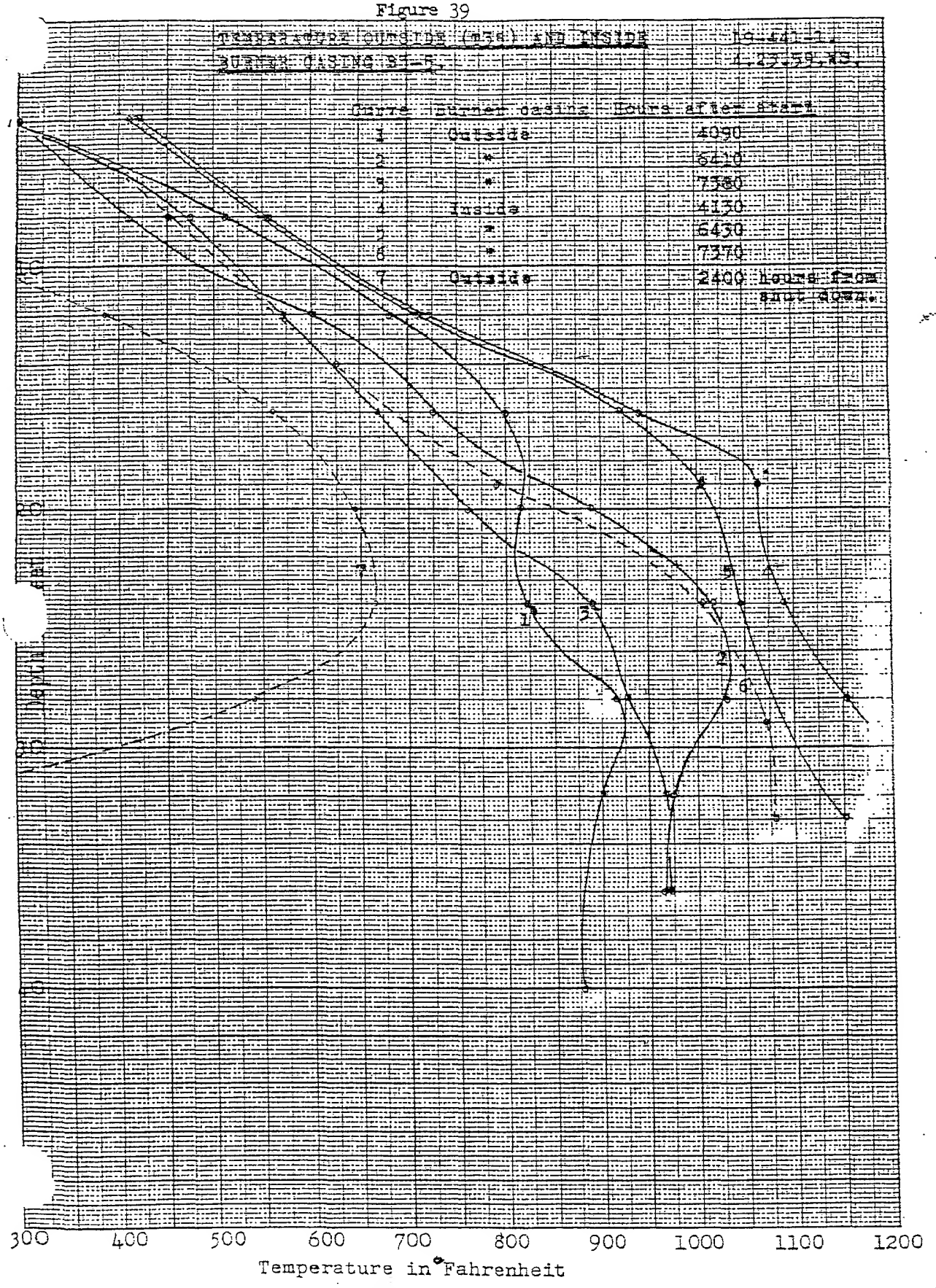

Temperature outside (mid) and inside
Burner casing 31-5.
19-41-1.
4-42-59-43.
Curve Burner casing Hours after start
1 Outside 4090
2 " 6410
3 " 7580
4 Inside 4130
5 " 6430
6 " 7370
7 Outside 2400 hours from shut down.
300
400
500
600
700
800
900
1000
1100
1200
Temperature in °Fahrenheit

Figure 40

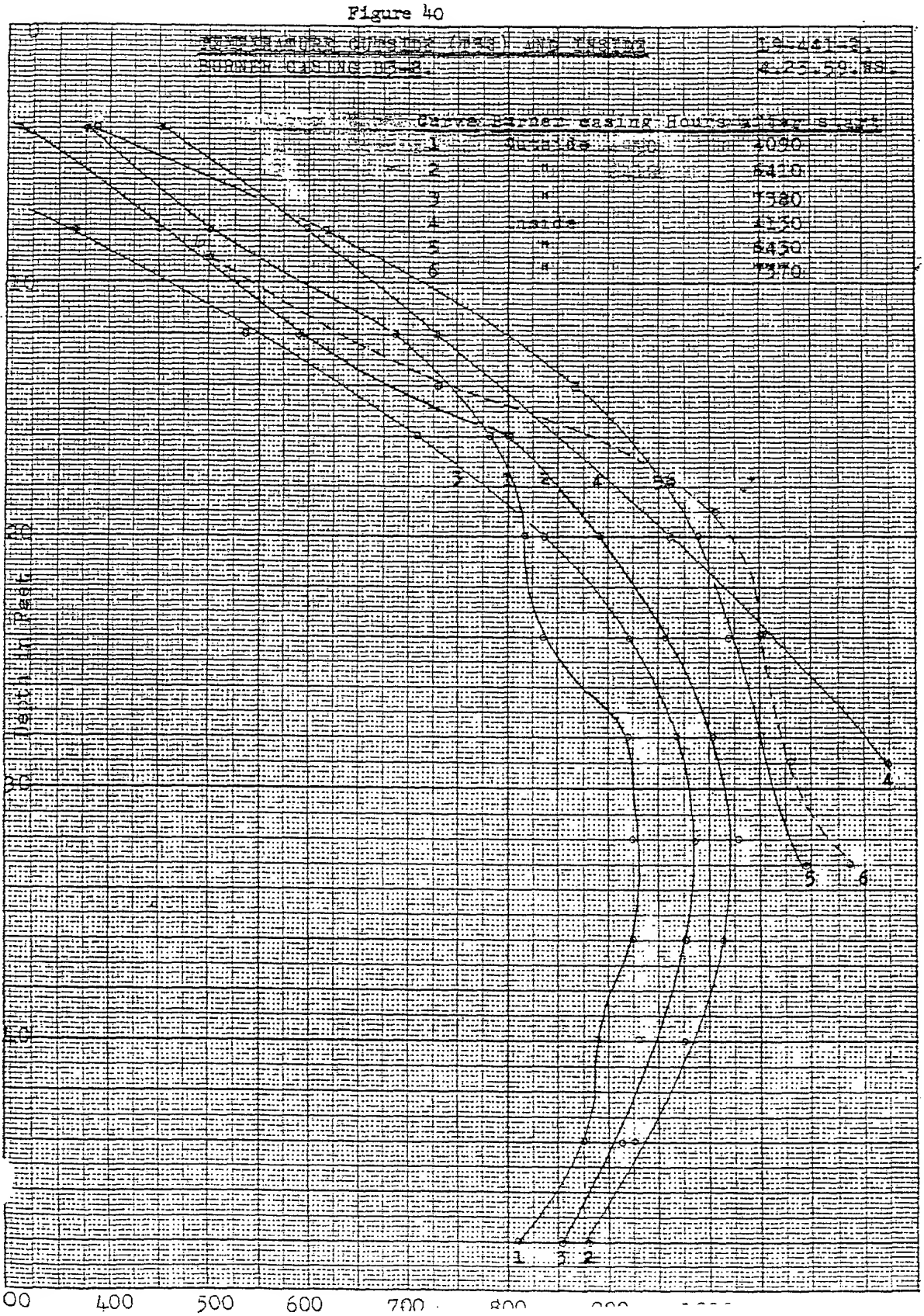

Curve Burner casing Hours after start
1 Outside 4090
2 " 5410
3 " 7580
4 Inside 4130
5 " 5430
6 " 7570
Depth in Feet
300
400
500
600
700
800

Figure 41

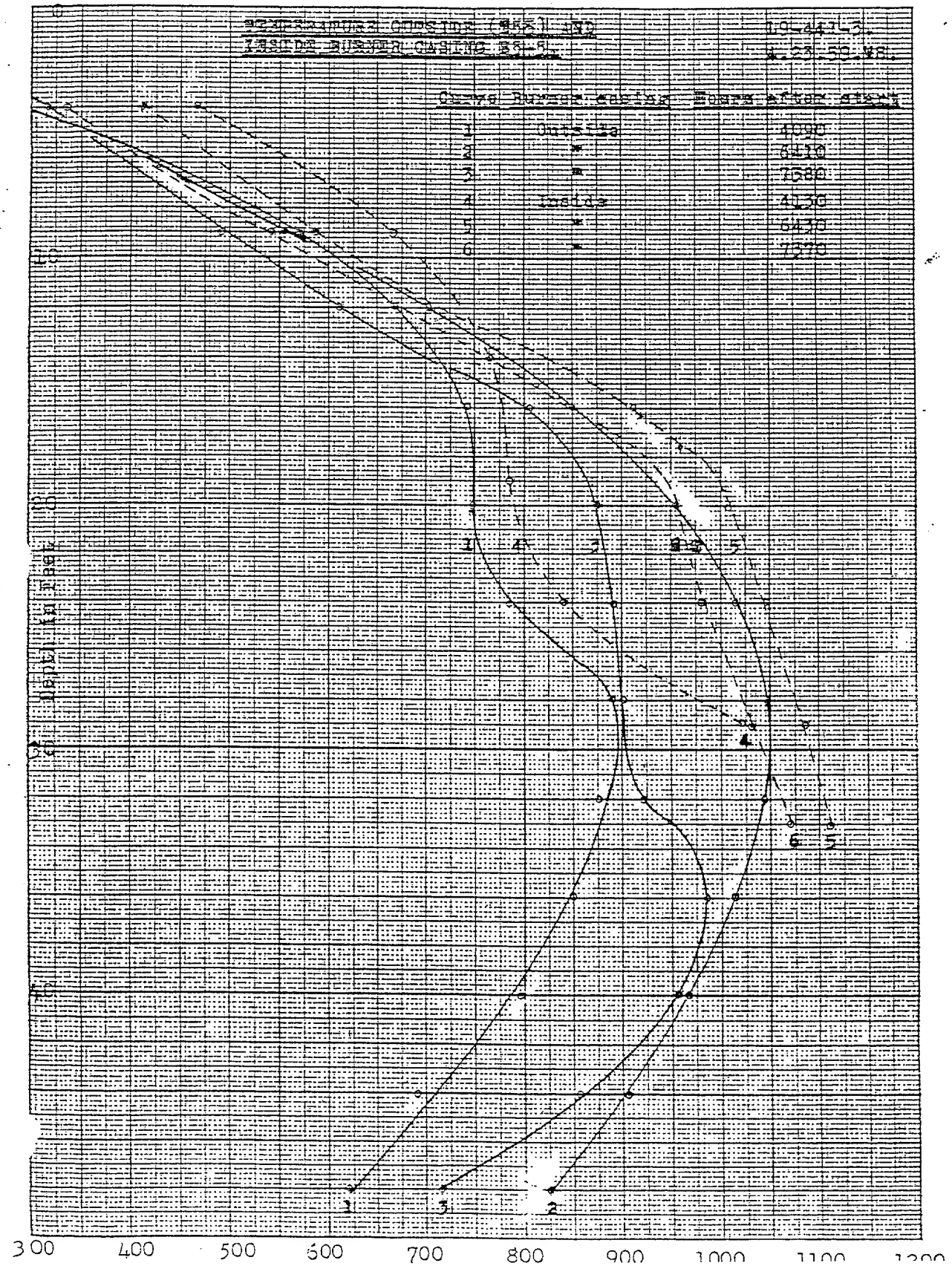

Curve Number
Casing
Total Depth
Outside
Inside
300
400
500
600
700
800
900
1000
1100
1200

Figure 42

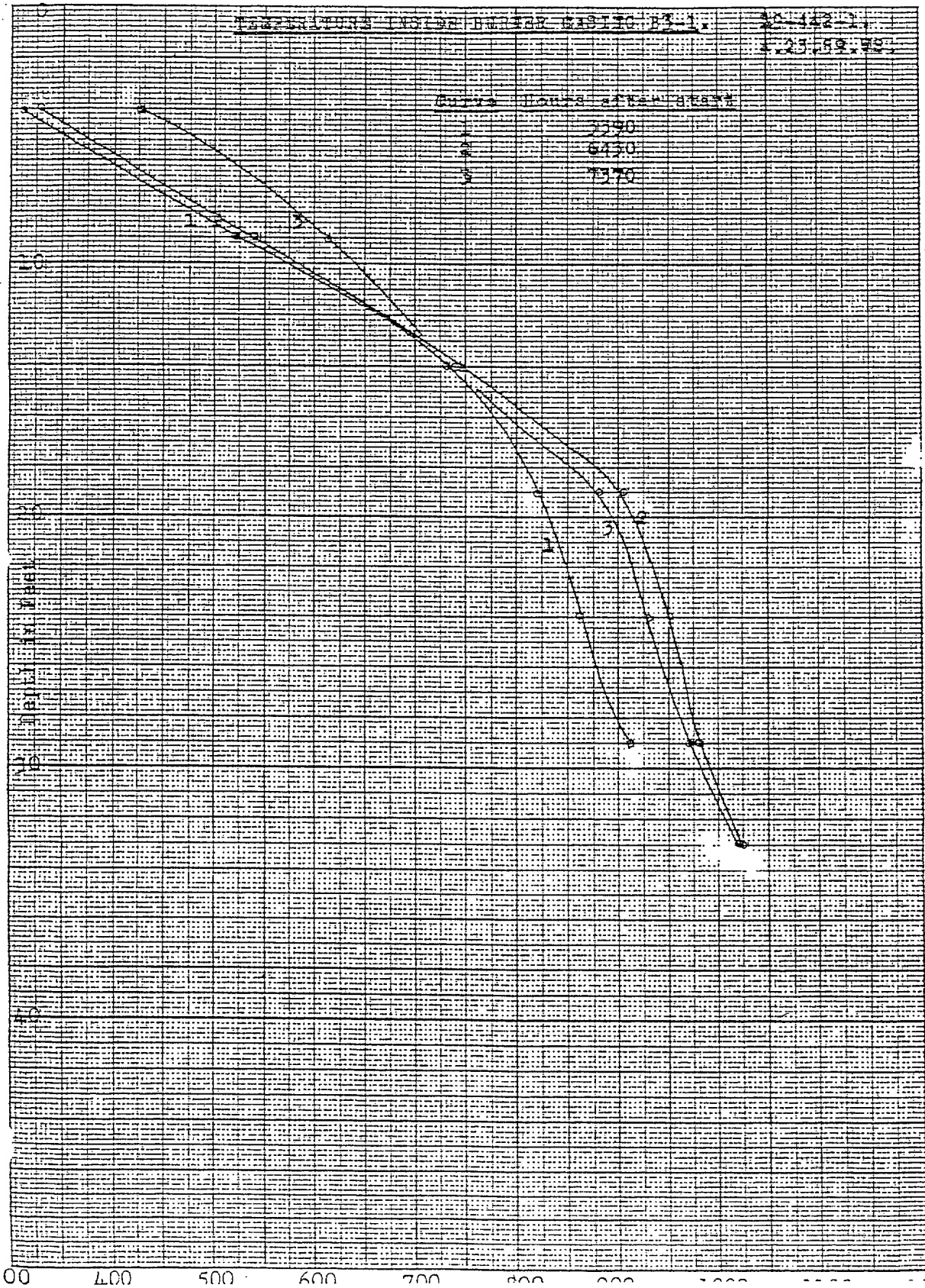

TEMPERATURE INSIDE BARRIER CASTLE B3-1.
AC-142-1.
1.23.59.72.
Curve Hours after start
1 2990
2 6430
3 7370
Depth in feet
300
400
500
600
700

Figure 43

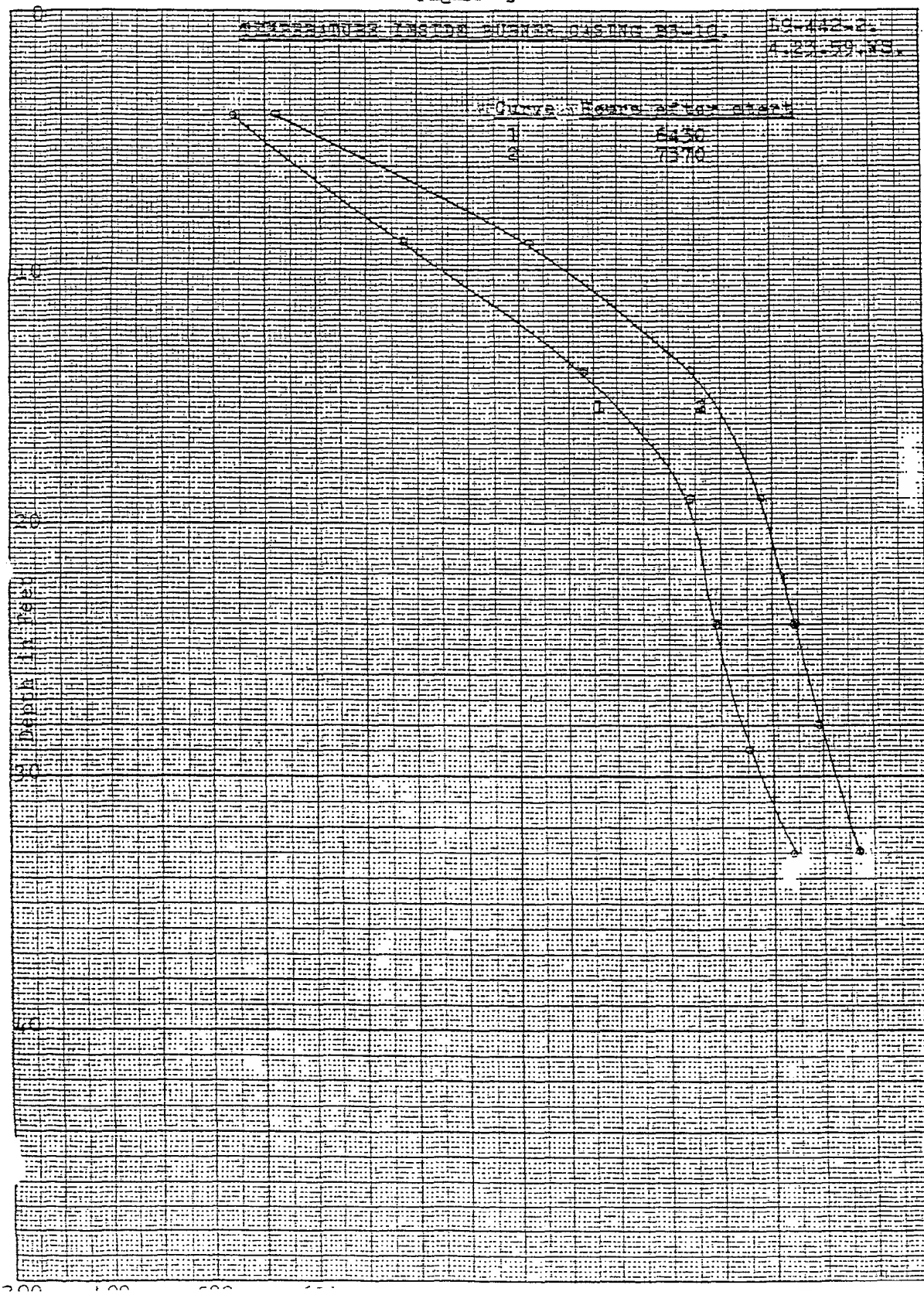


Figure 44

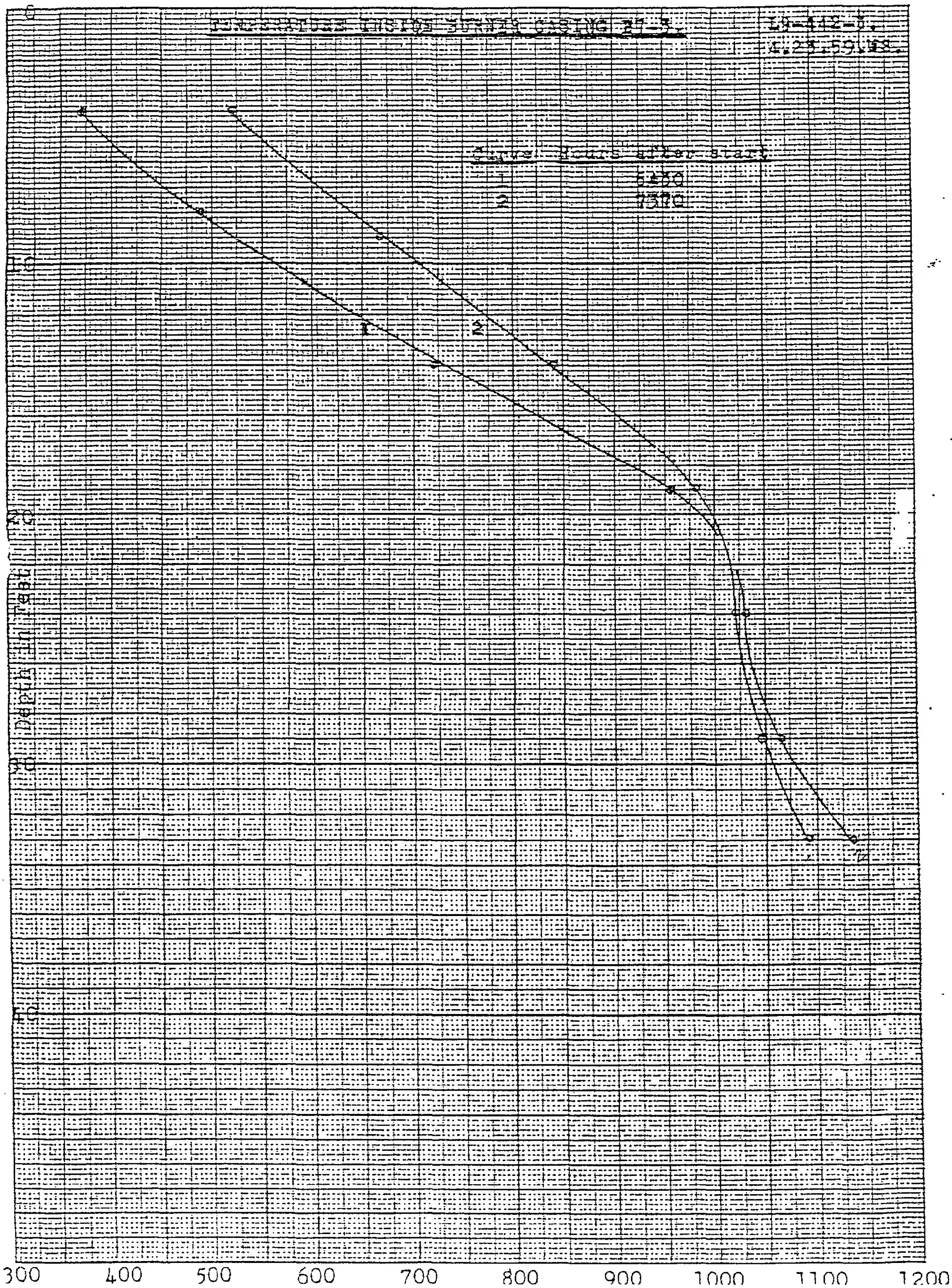
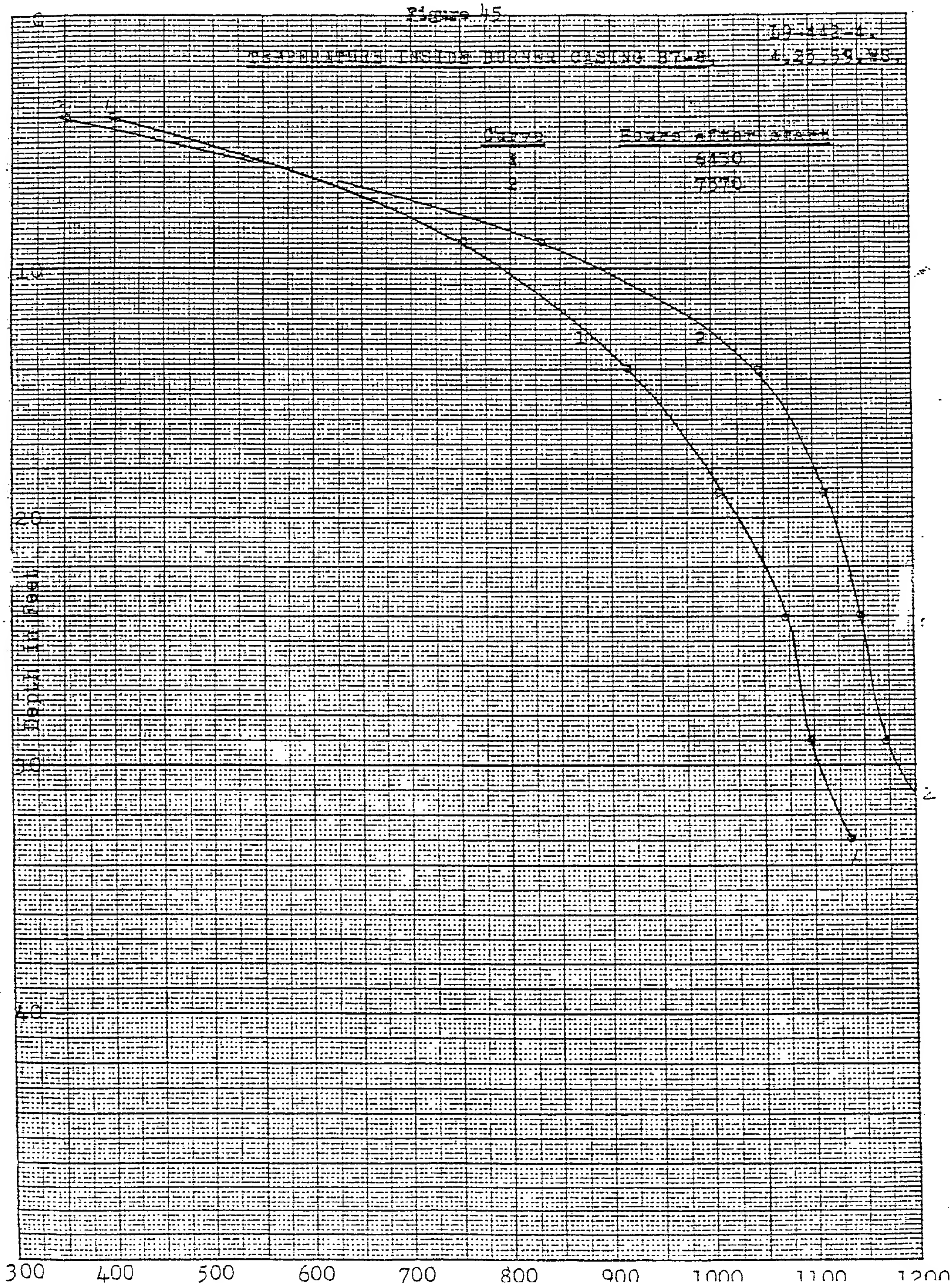

Hours after start
1
2
Depth in Test
0
10
20
30
40
300
400
500
600
700
800
900
1000
1100
1200

Figure 45



Curve
1
2
6450
7370
Depth in Feet
0
10
20
30
40
300
400
500
600
700
800
900
1000
1100
1200

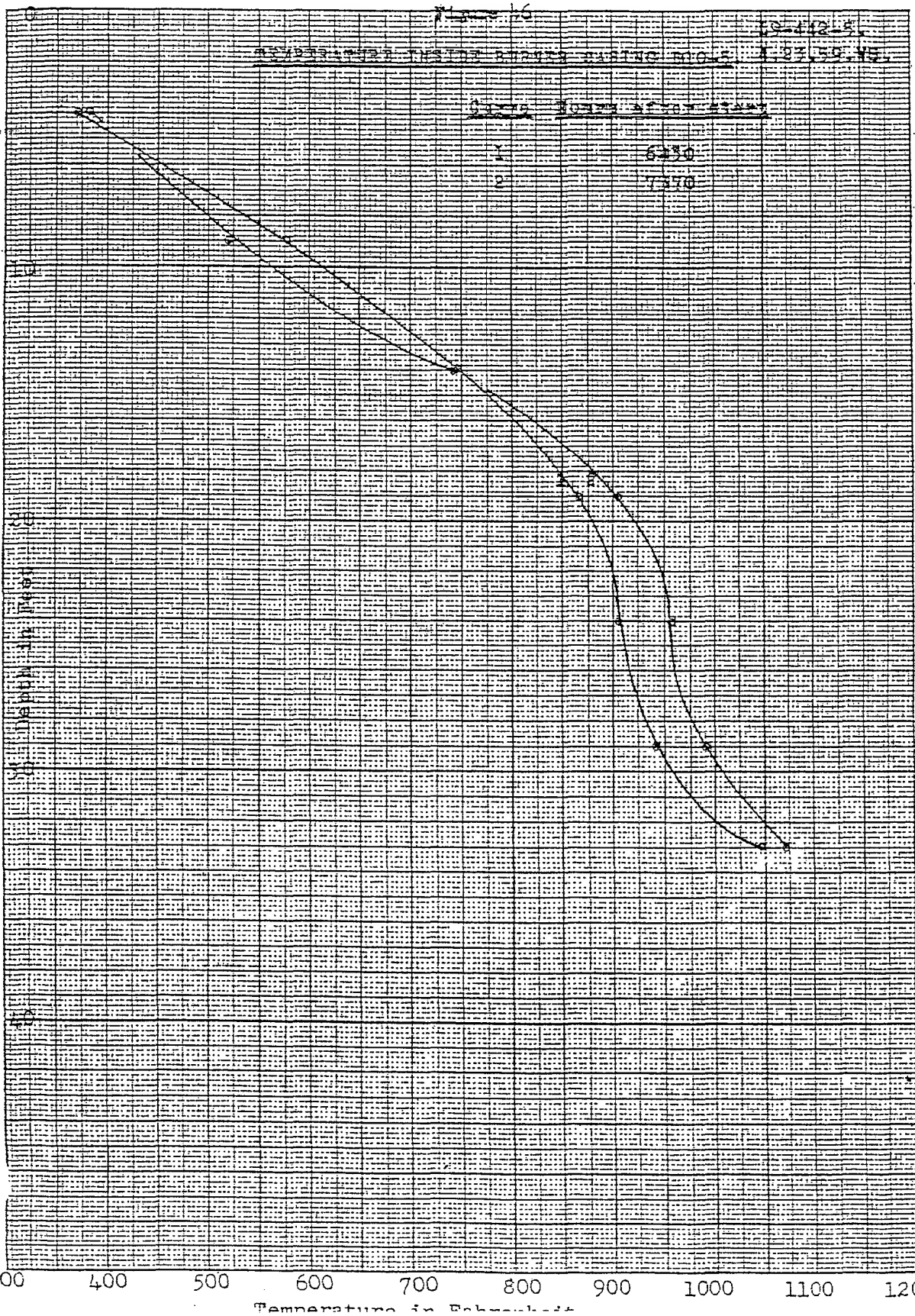

Case
1
2
6:30
7:30
300
400
500
600
700
800
900
1000
1100
1200
Temperature in Fahrenheit

Figure 47

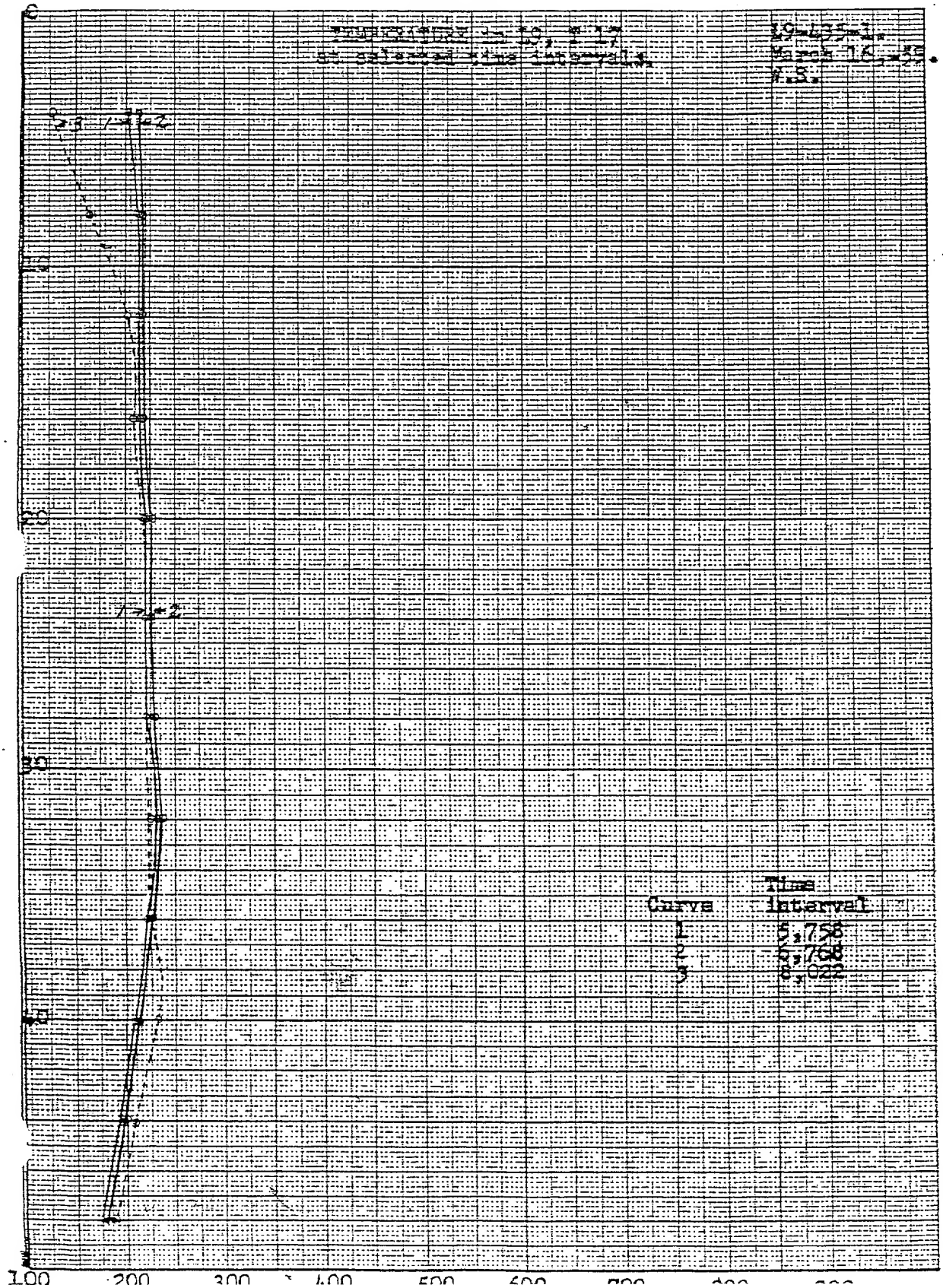
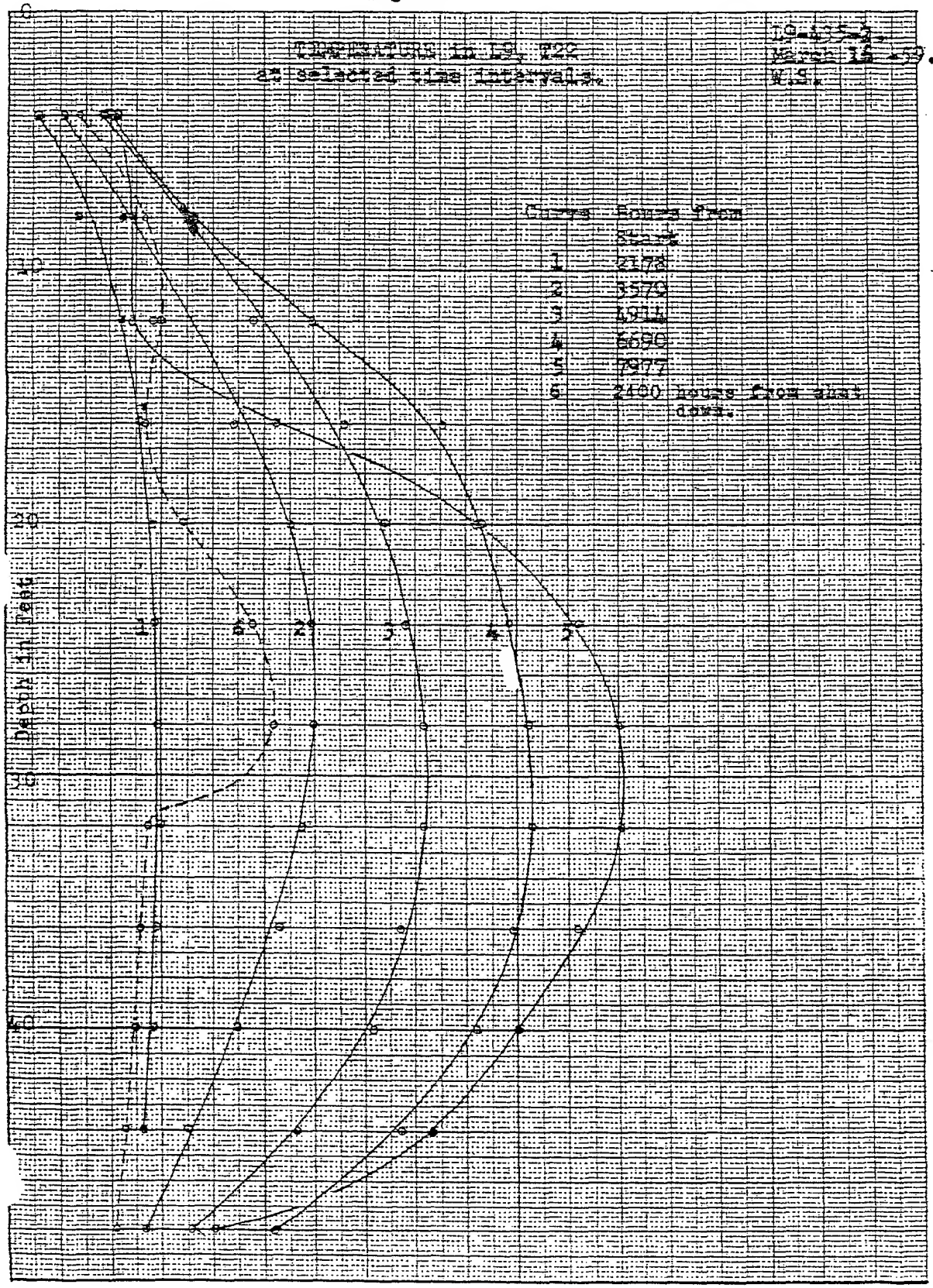


Figure 48


TEMPERATURE in Lg. #22
at selected time intervals.
Lg-435-2
March 15 -
W.S.
Curve Hours from Start
1 2178
2 3579
3 4914
4 6690
5 7977
6 2400 hours from start
days.
Depth in feet
10
20
30
40

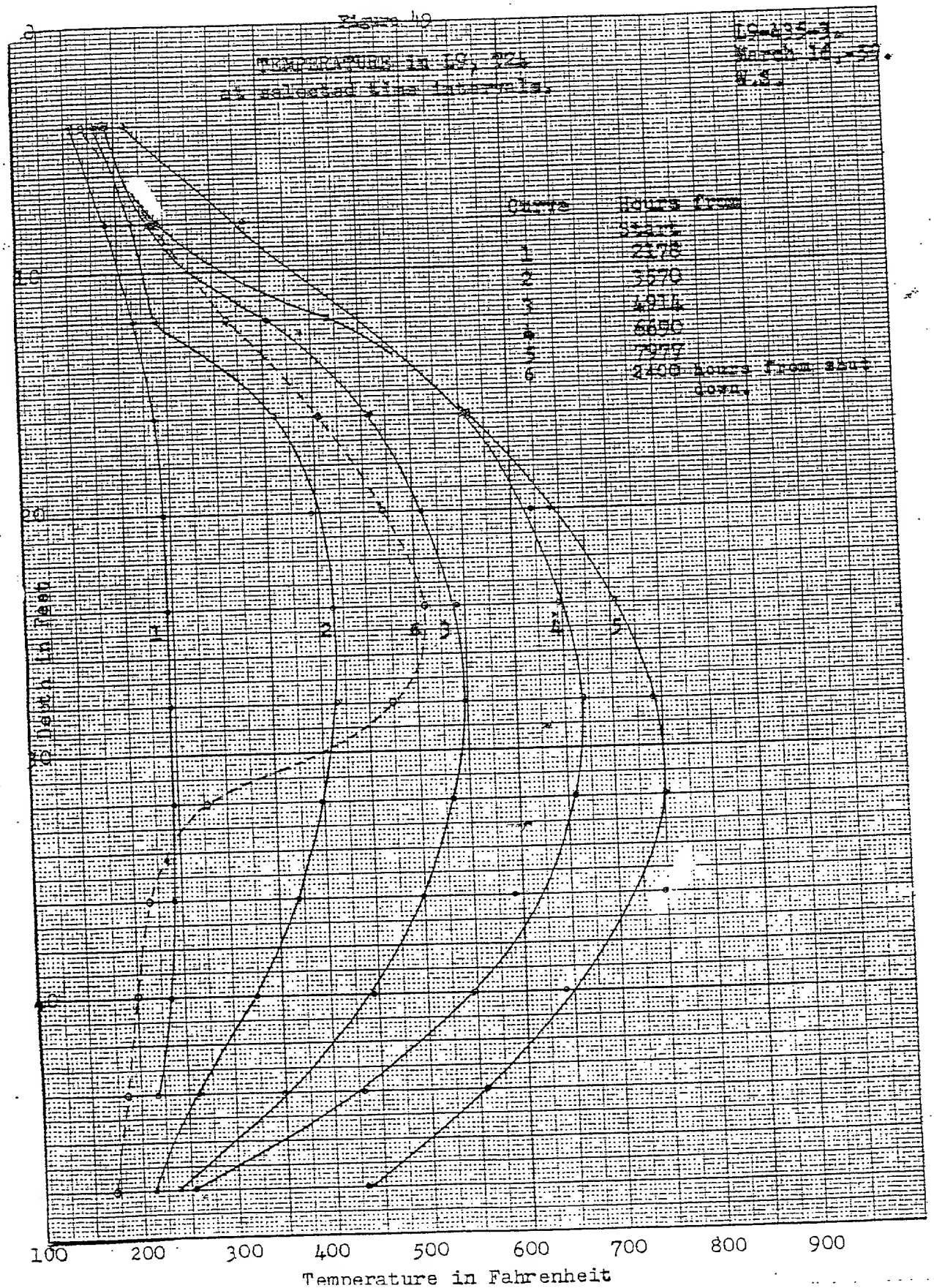
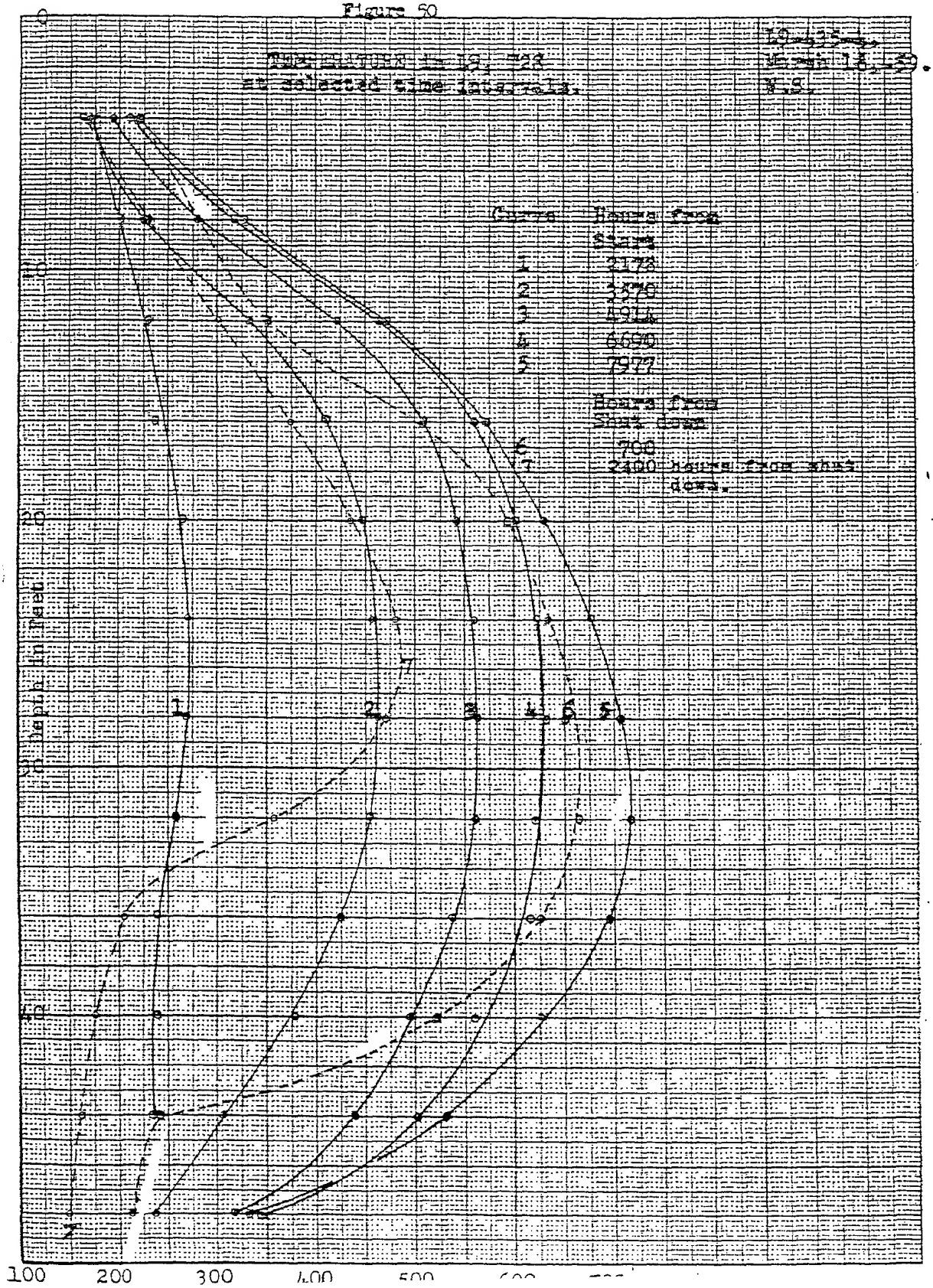
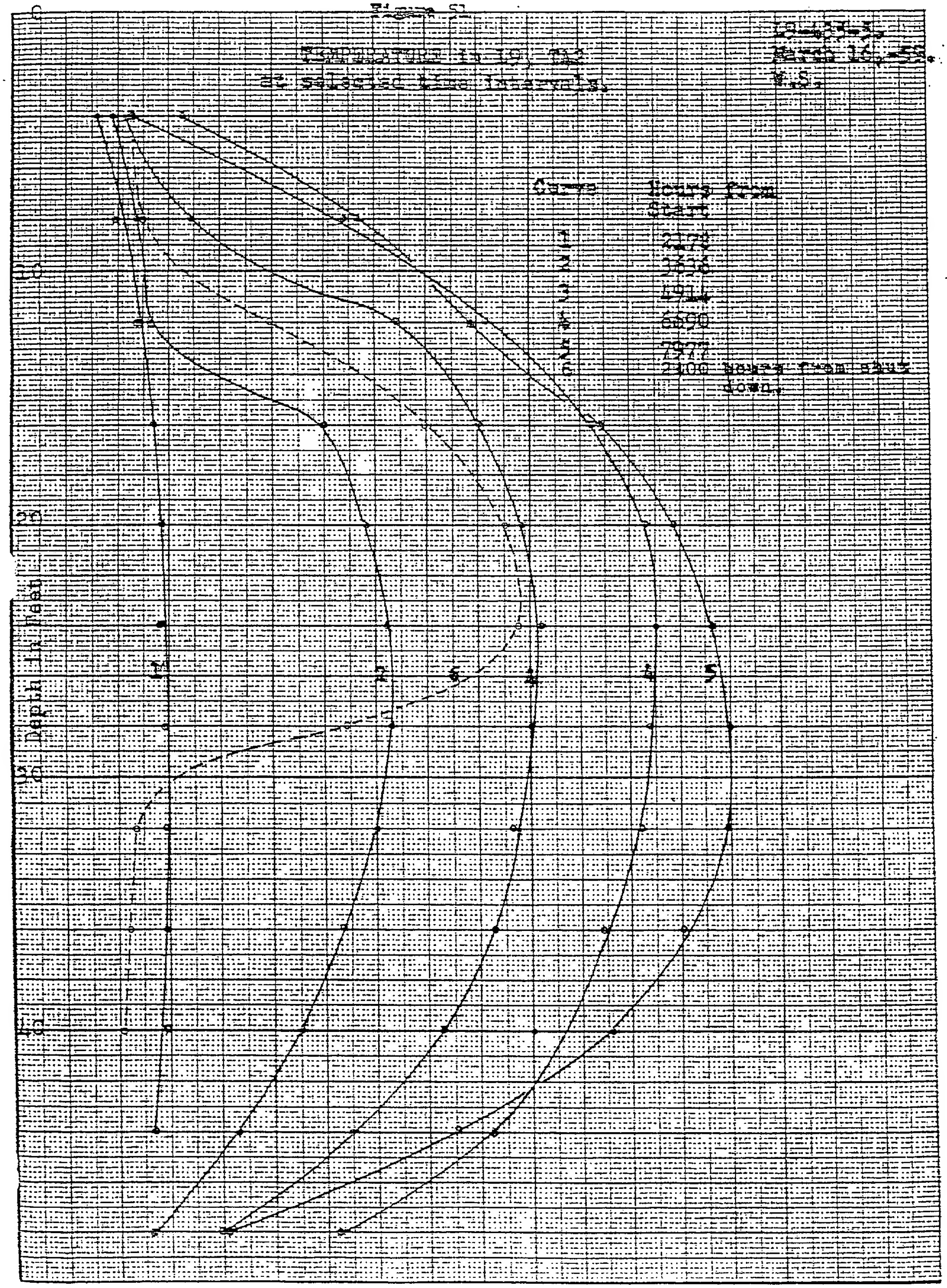


Figure 49
TEMPERATURE IN LS, 324
at selected time intervals
LS-135-3
March 16, 52
W.S.
Curve Hours from start
1 2378
2 3570
3 4914
4 6650
5 7977
6 2400 hours from shut down.
Depth in feet
100
200
300
400
500
600
700
800
900
Temperature in Fahrenheit

Figure 50


Curve
Hours from Start
1 2178
2 3370
3 4914
4 6690
5 7977
Hours from Shut down
6 700
7 2400 hours from shut down.
0
20
40
100
200
300
400
500



at selected time intervals.
W.S.
Curve
Hours from Start
1
2
3 4914
4 6690
5 7977
6 2100 hours from shut down.
0
10
20
30
40
Depth in Feet
1
2
6
3
4
5

Figure 52

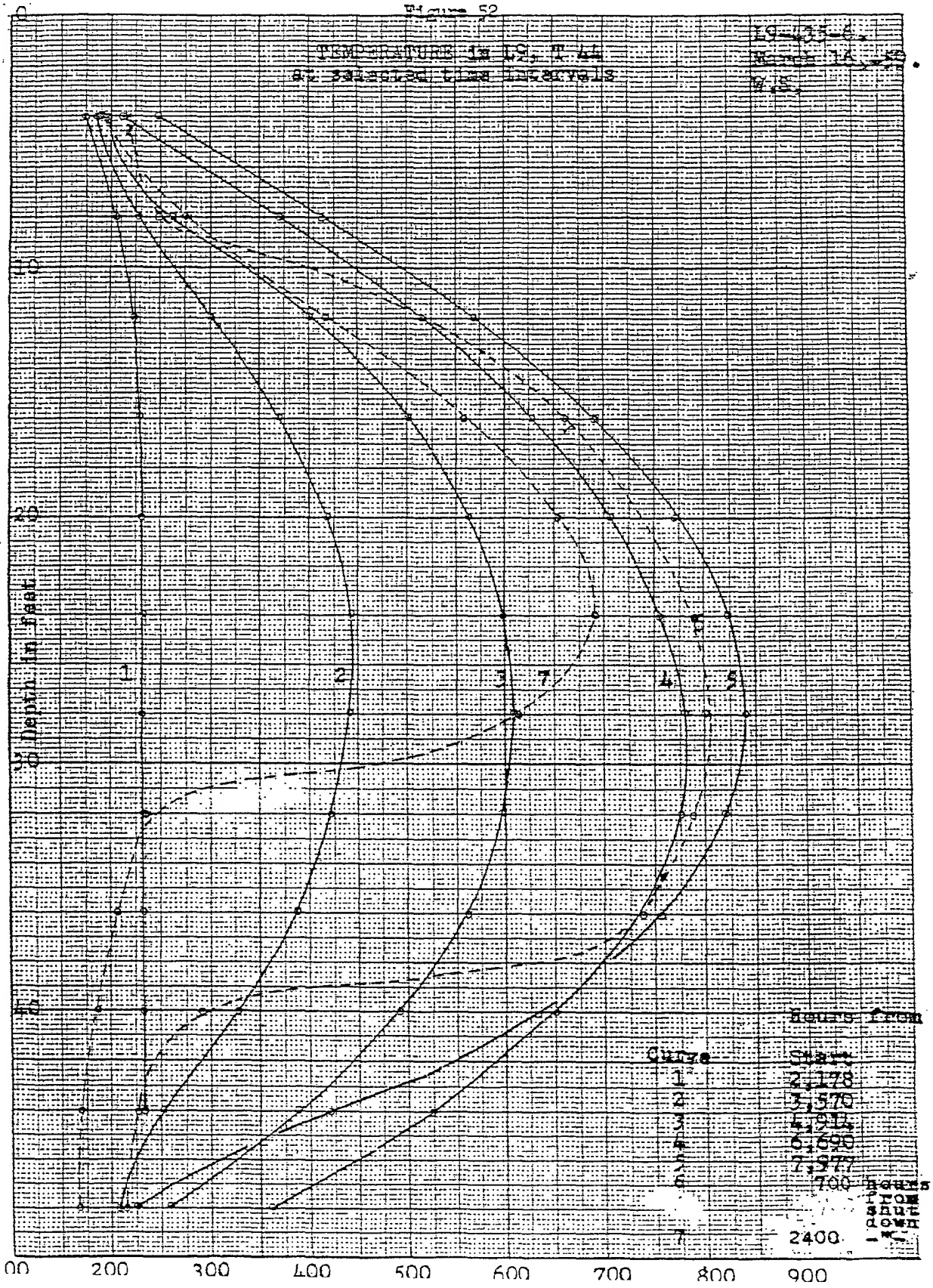
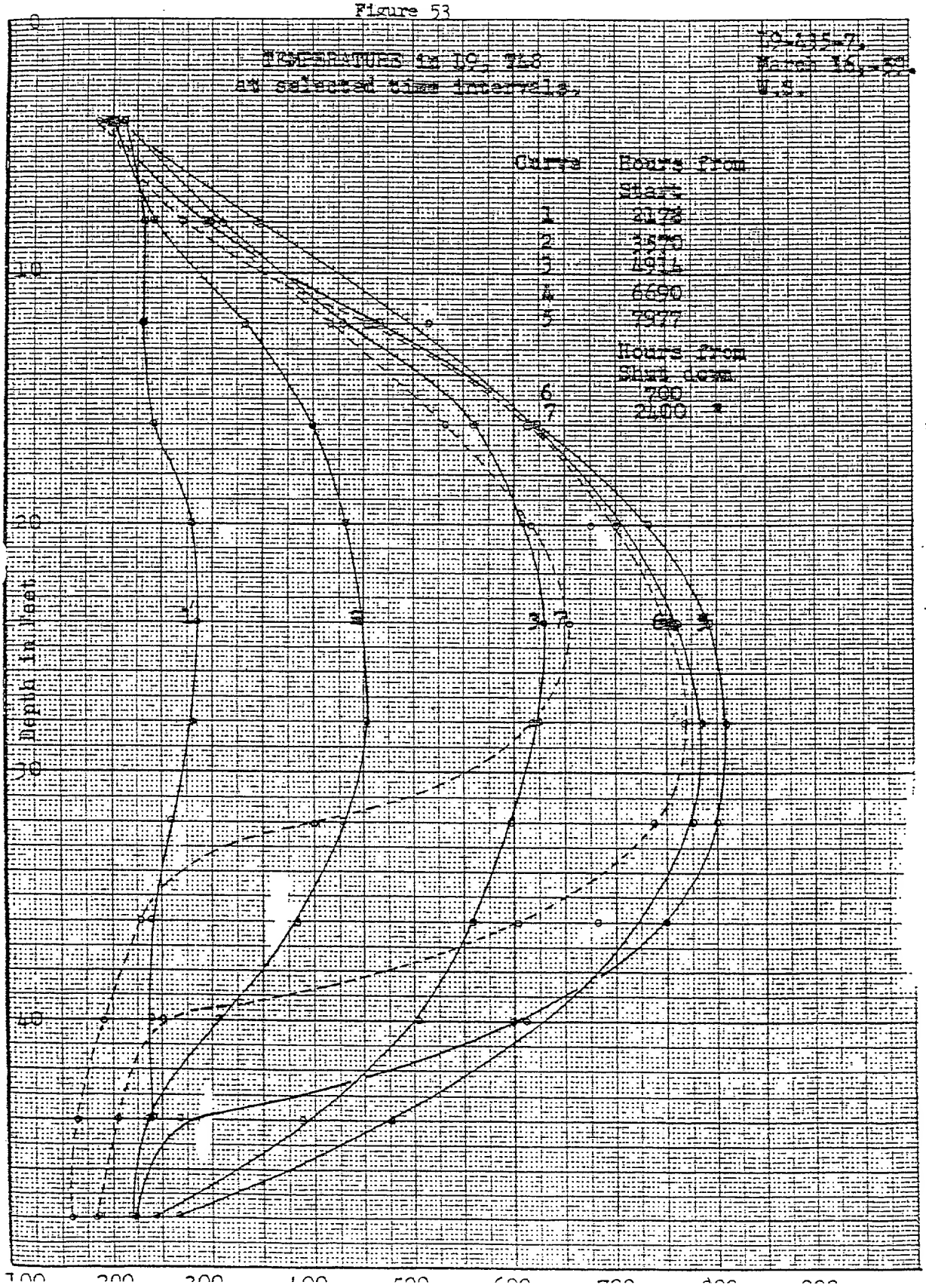

TEMPERATURE IN L2, T 44
at selected time intervals
L9-35-6
March 14, 1950
W.S.
Depth in feet
0
10
20
30
100
200
300
400
500
600
700
800
900
Hours from
Curve Start
1 2,178
2 3,570
3 4,914
4 6,690
5 7,977
6 700 hours from shut down
7 2400

Figure 53


Curve
Hours from Start
1
2
3
4
5
Hours from Shut down
6
7
Depth in feet

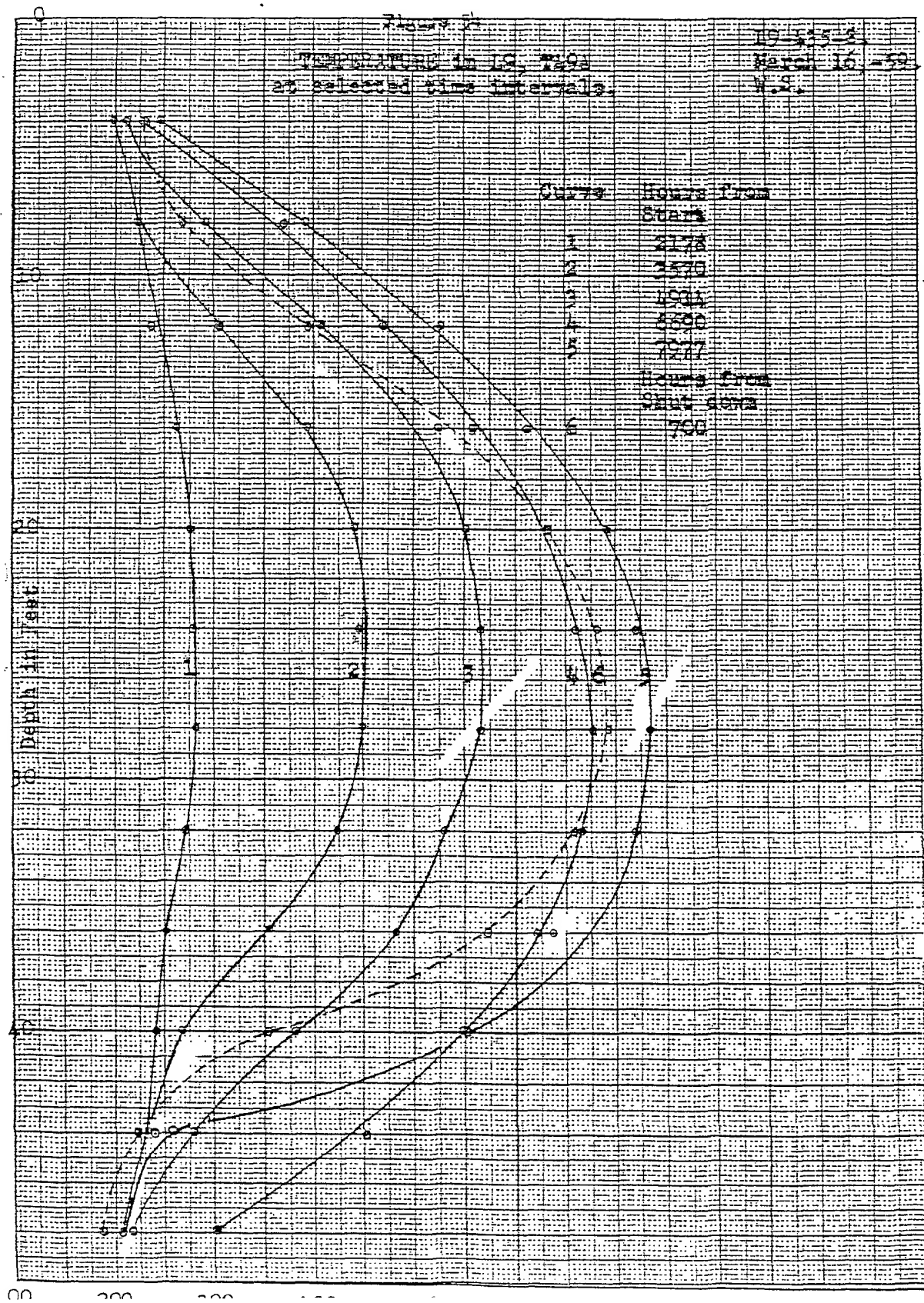

Temperature in °C
Depth in feet
0
10
20
30
40
Curve
Hours from Start
1
2178
2
3570
3
4934
4
6690
5
7247
Hours from Start
700

Figure 55

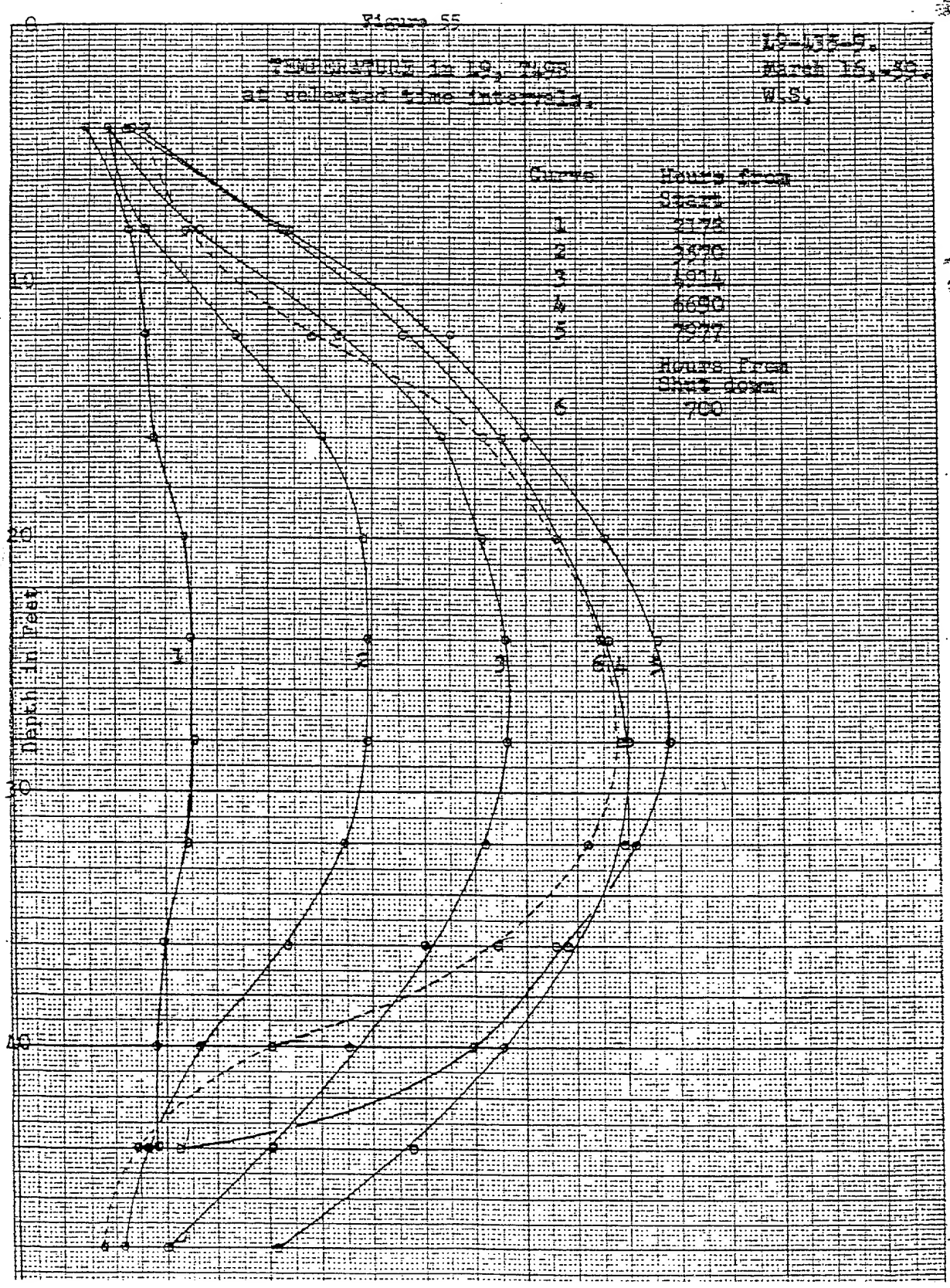
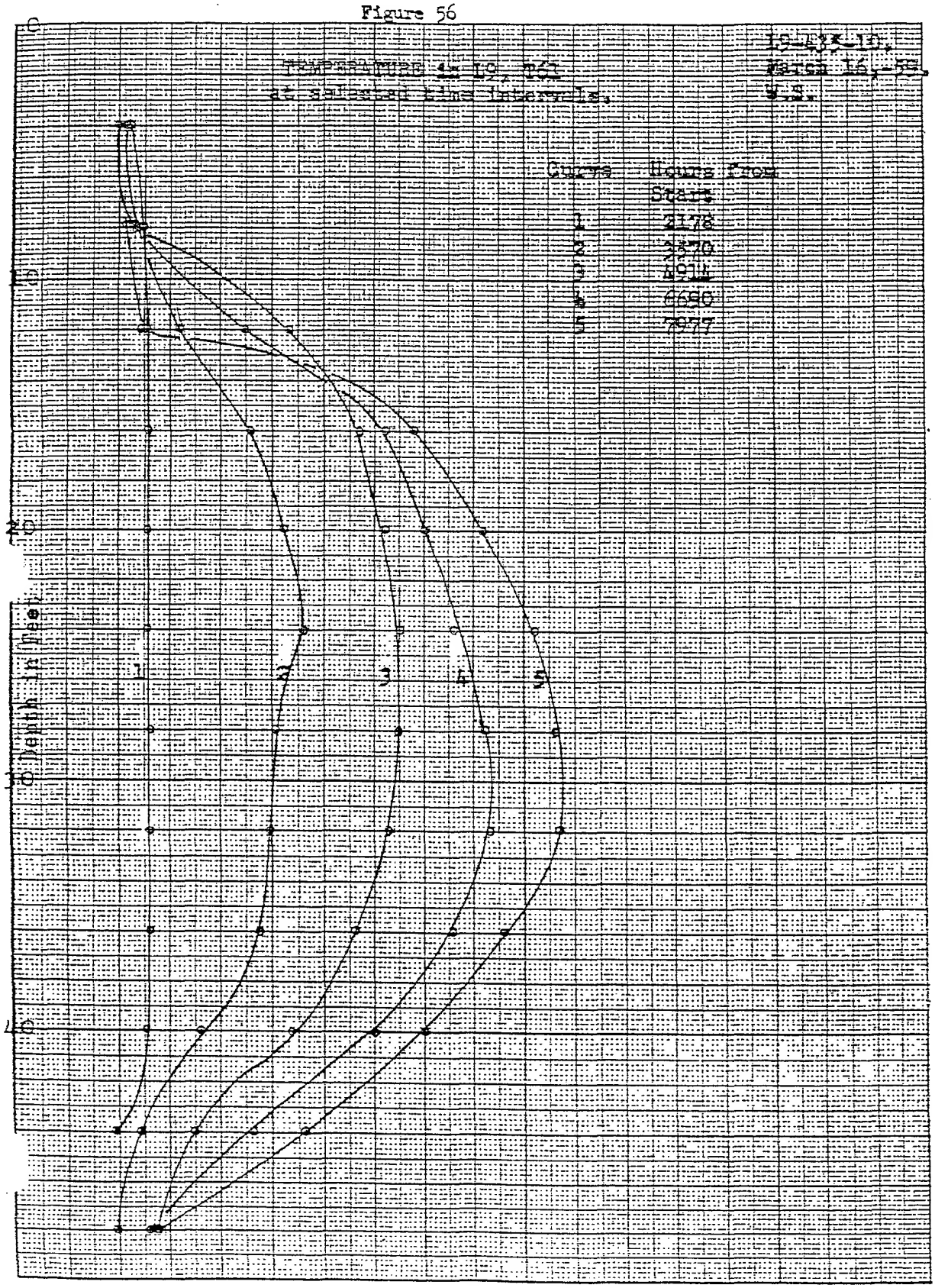

Depth in Feet
0
10
20
30
40
Curve
Hours from Start
1
2
3
4
5
6
2178
3670
4914
6690
7977
Hours from Start 700

Figure 56


TEMPERATURE 4= 12, 267
at selected time intervals.
Curve Hours From Start
1 2178
2 3370
3 4914
4 6690
5 7977
Depth in feet
0
10
20
40
1
2
3
4
5

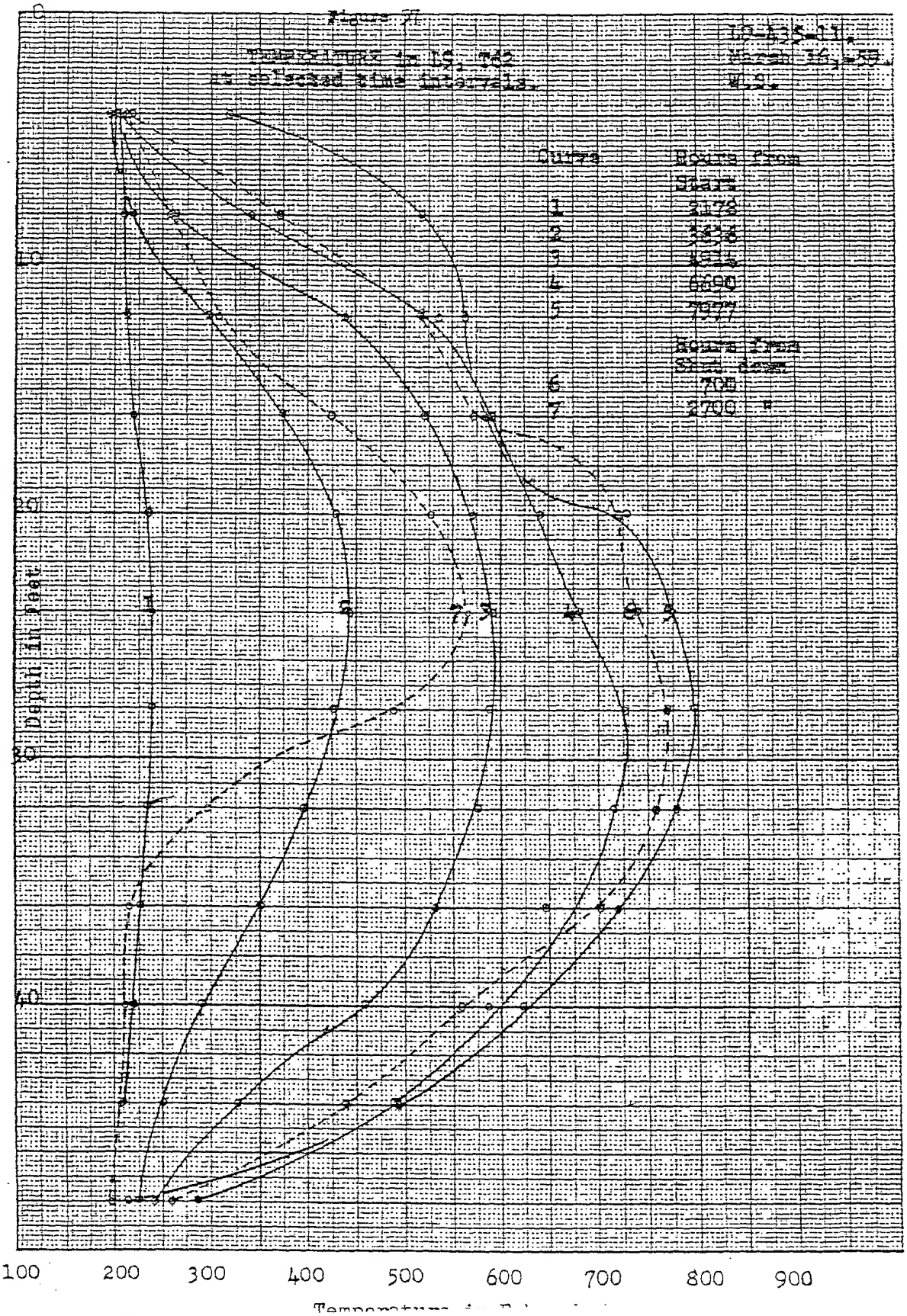


Figure 58

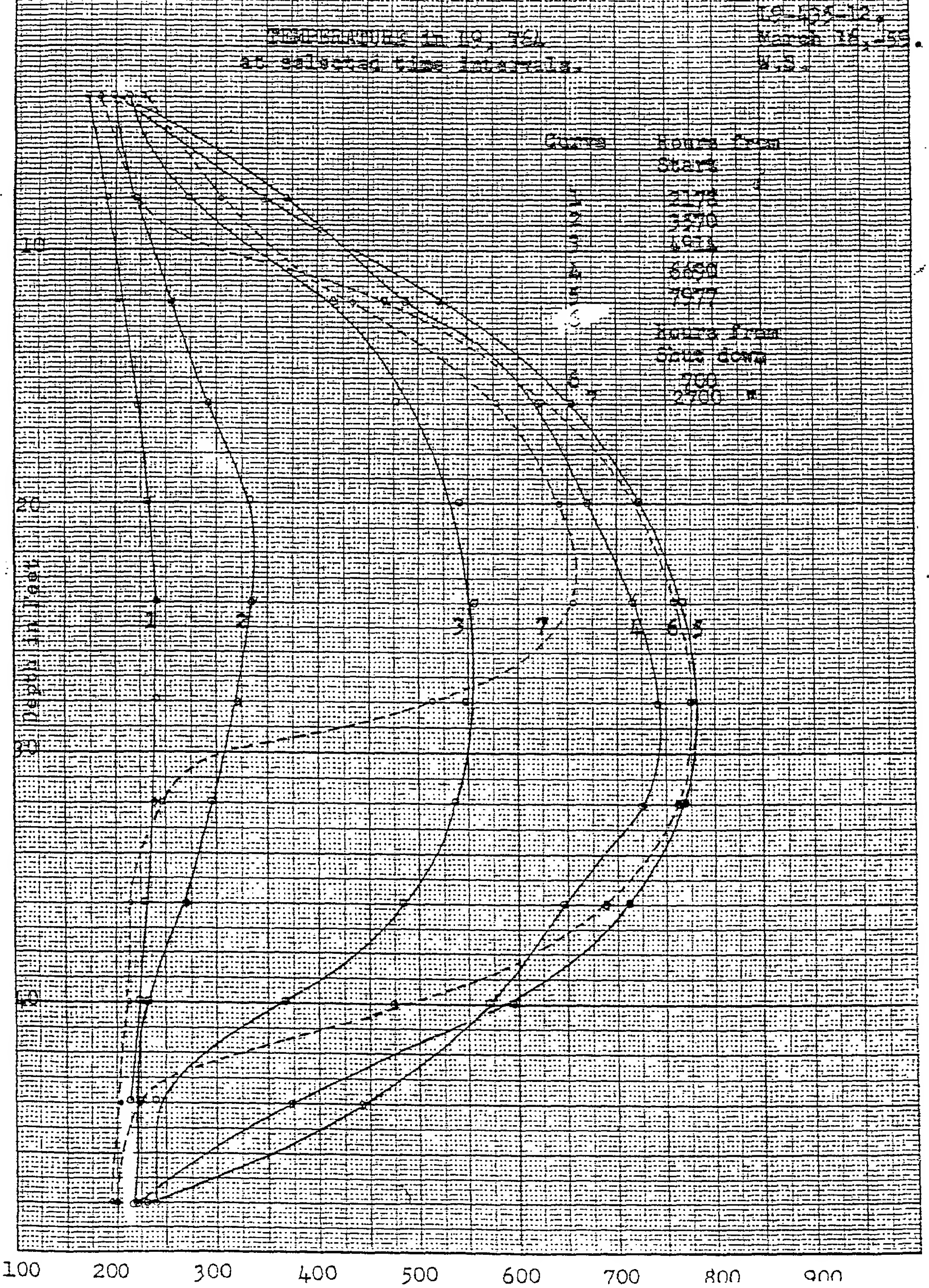

at selected time intervals.
Curve
Hours from Start
1 2173
2 3370
3 [illegible]
4 6650
5 7977
Hours from Shut down
700
7 2700
Depth in Feet
0
10
20
30
40
100
200
300
400
500
600
700
800
900

Figure 59

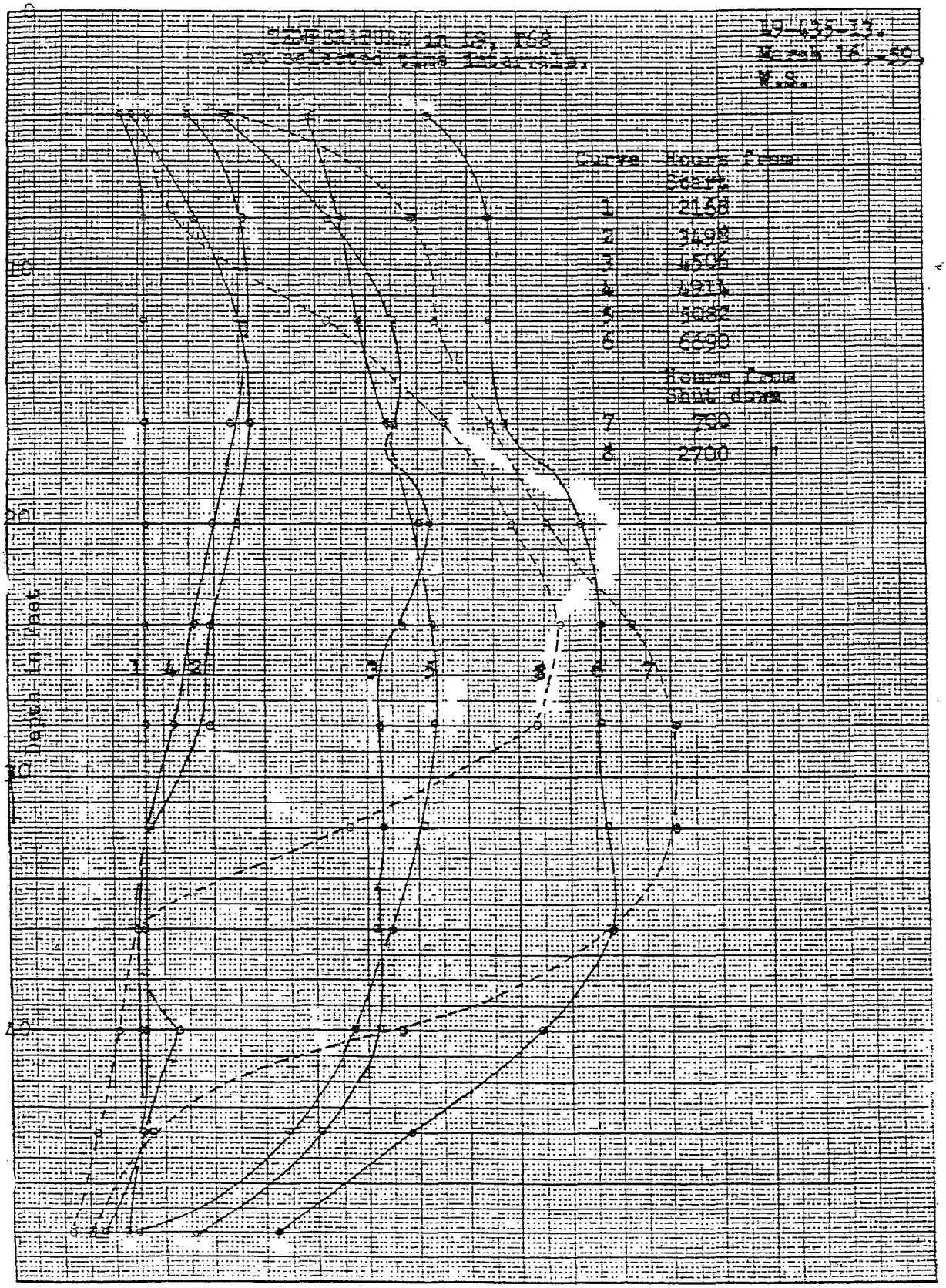

TEMPERATURE IN °F, FEB
59-435-13.
Curve Hours from Start
1 2158
2 3498
3 4505
4 4911
5 5982
6 6690
Hours from Shut down
7 750
8 2700
Depth in Feet

Figure 60

TEMPERATURE in [illegible], °F.
at selected time intervals.

[illegible]-33-1[illegible]
Baran 16,-38,
W.S.

Curve	Hours from Start
1	9389
2	8738
3	8022

0
10
20
30
40
Depth in feet
1.25
100
200
300
400
500
600
700
800
900

Figure 61

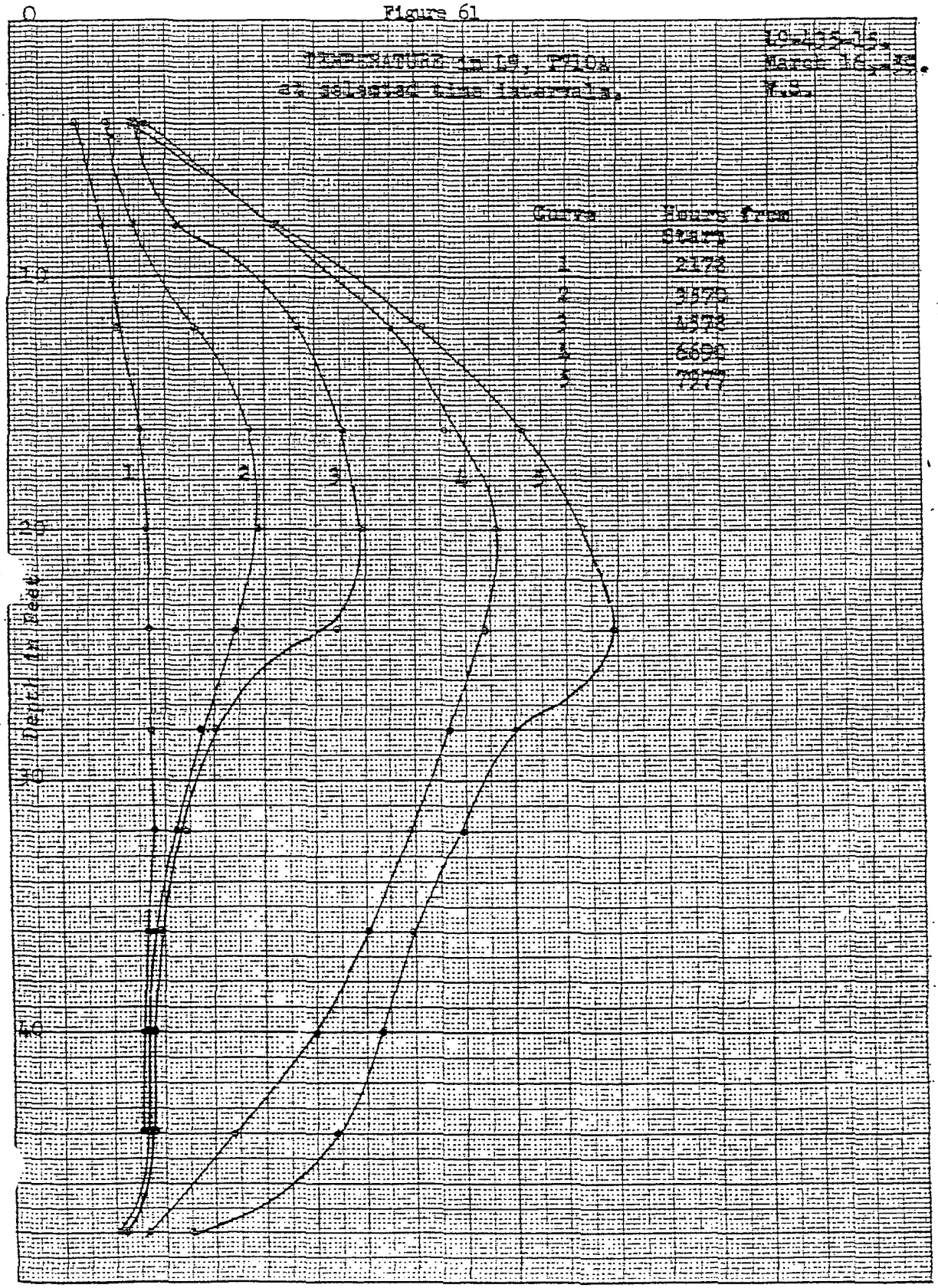


Figure 62

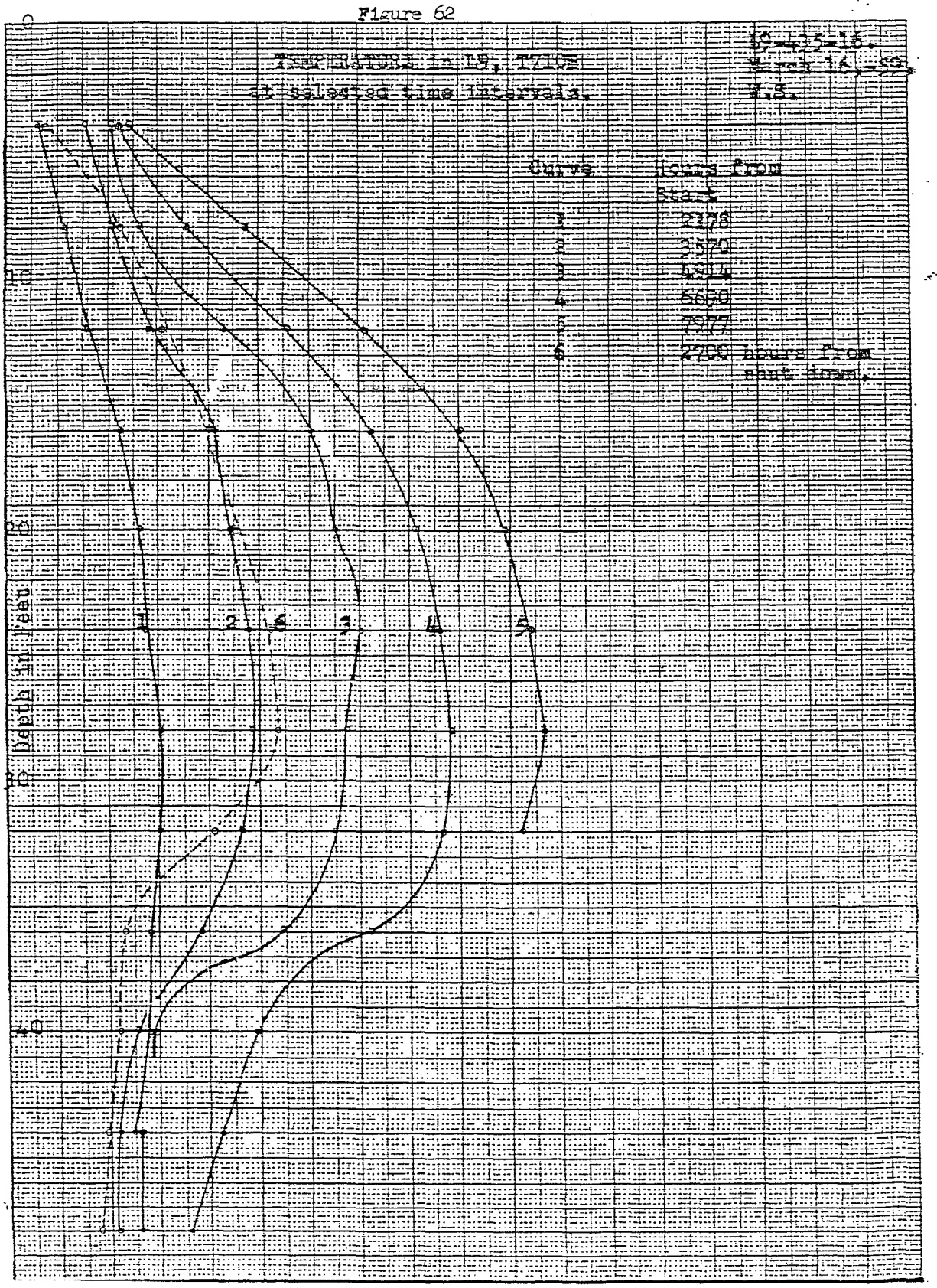
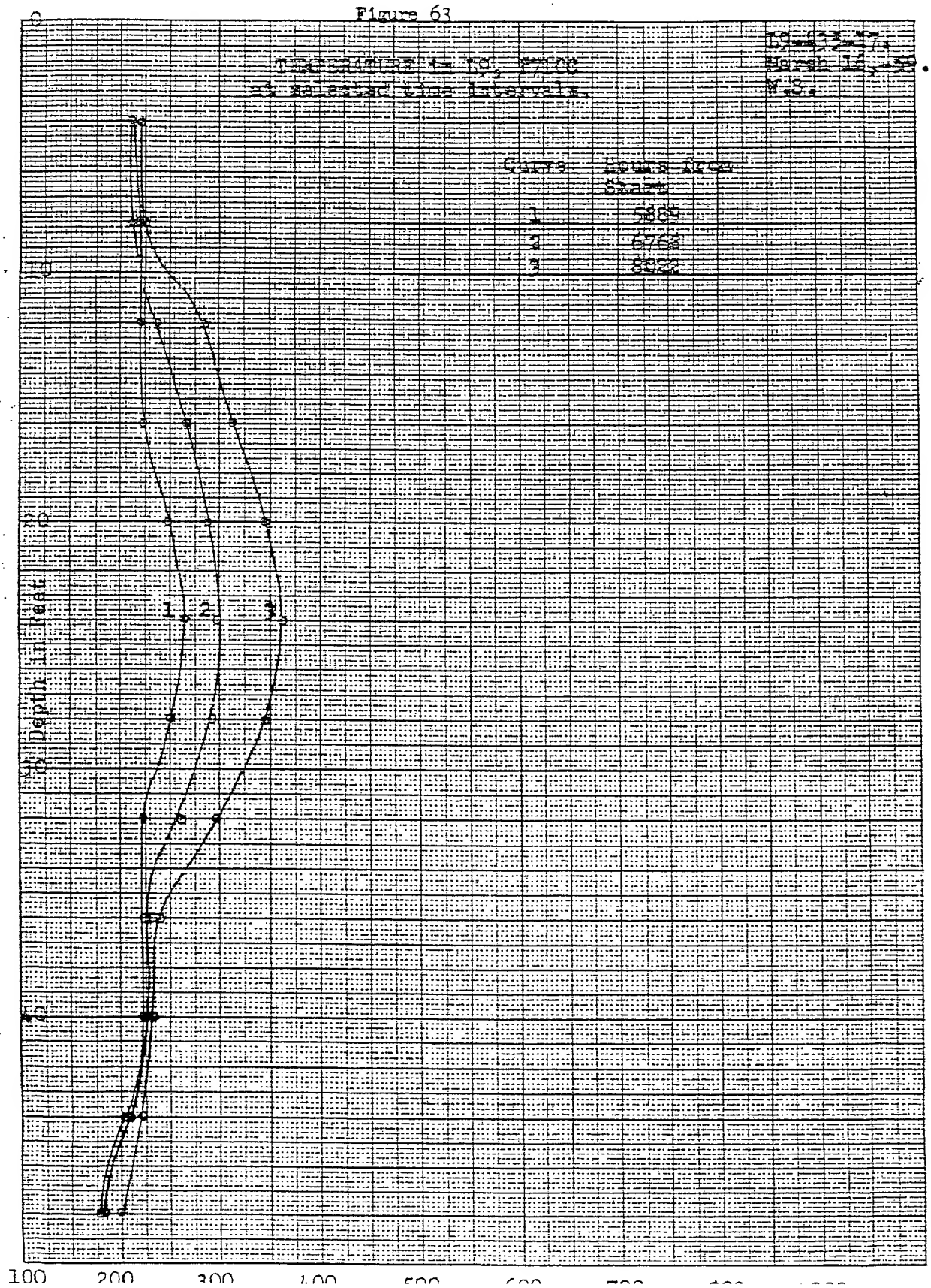
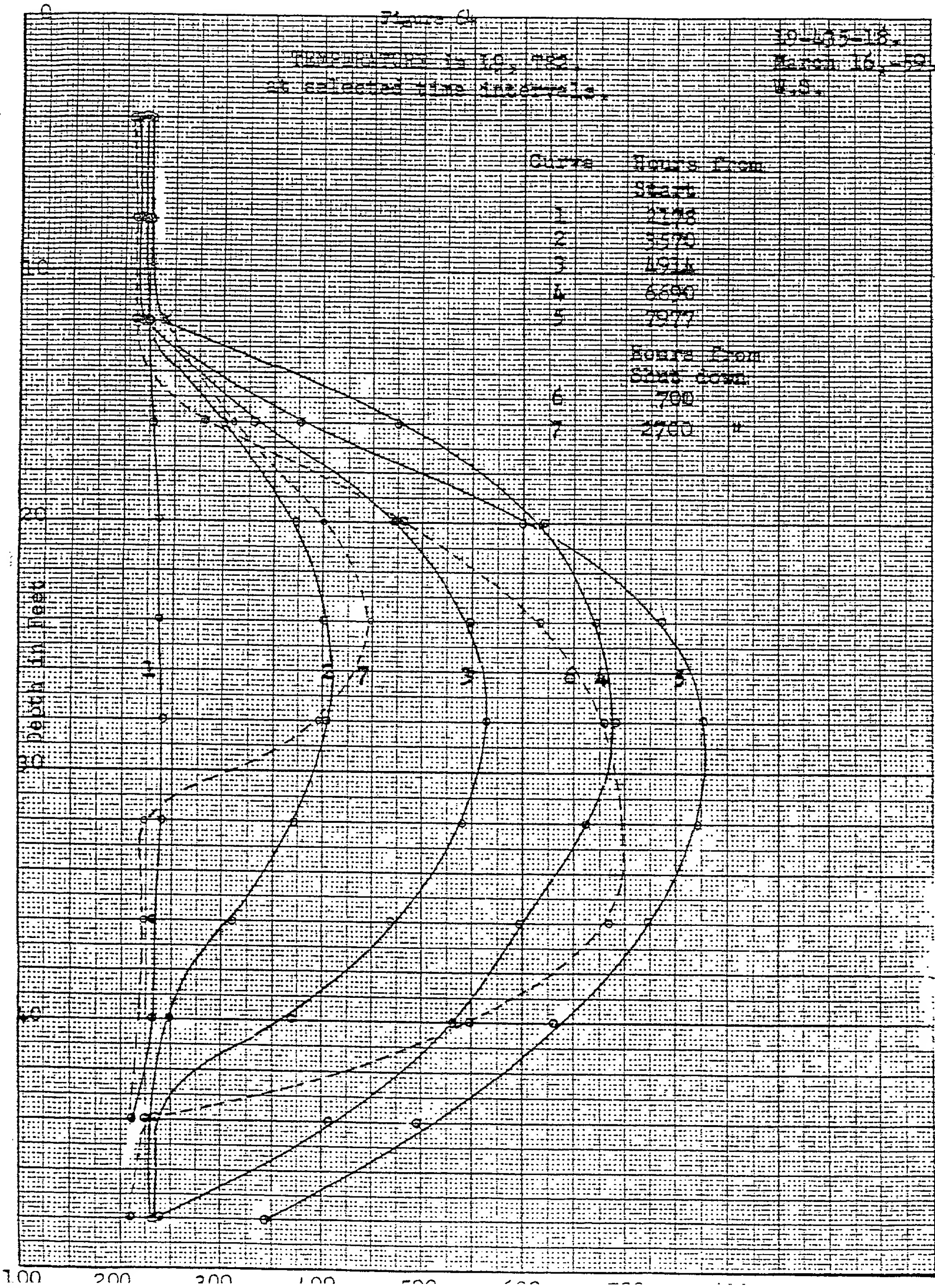

TEMPERATURE in DEGREES F.
at selected time intervals.
Curve
Hours from Start
1
2178
2
3570
3
4914
4
6660
5
7977
6
2700 hours from shut down.
Depth in feet

Figure 63


Temperature in °C. after
at selected time intervals.
Curve
Hours from
Start
1
2
3
0
10
20
30
40
Depth in feet
100
200
300
400
500
600
700
1 2 3



19-435-18.
March 16, -59.
W.S.
Curve
Hours from Start
1 2178
2 3579
3 4914
4 6690
5 7977
Hours from Shut down
6 700
7 2700 "
Depth in Feet
0
10
20
30
40
100
200
300

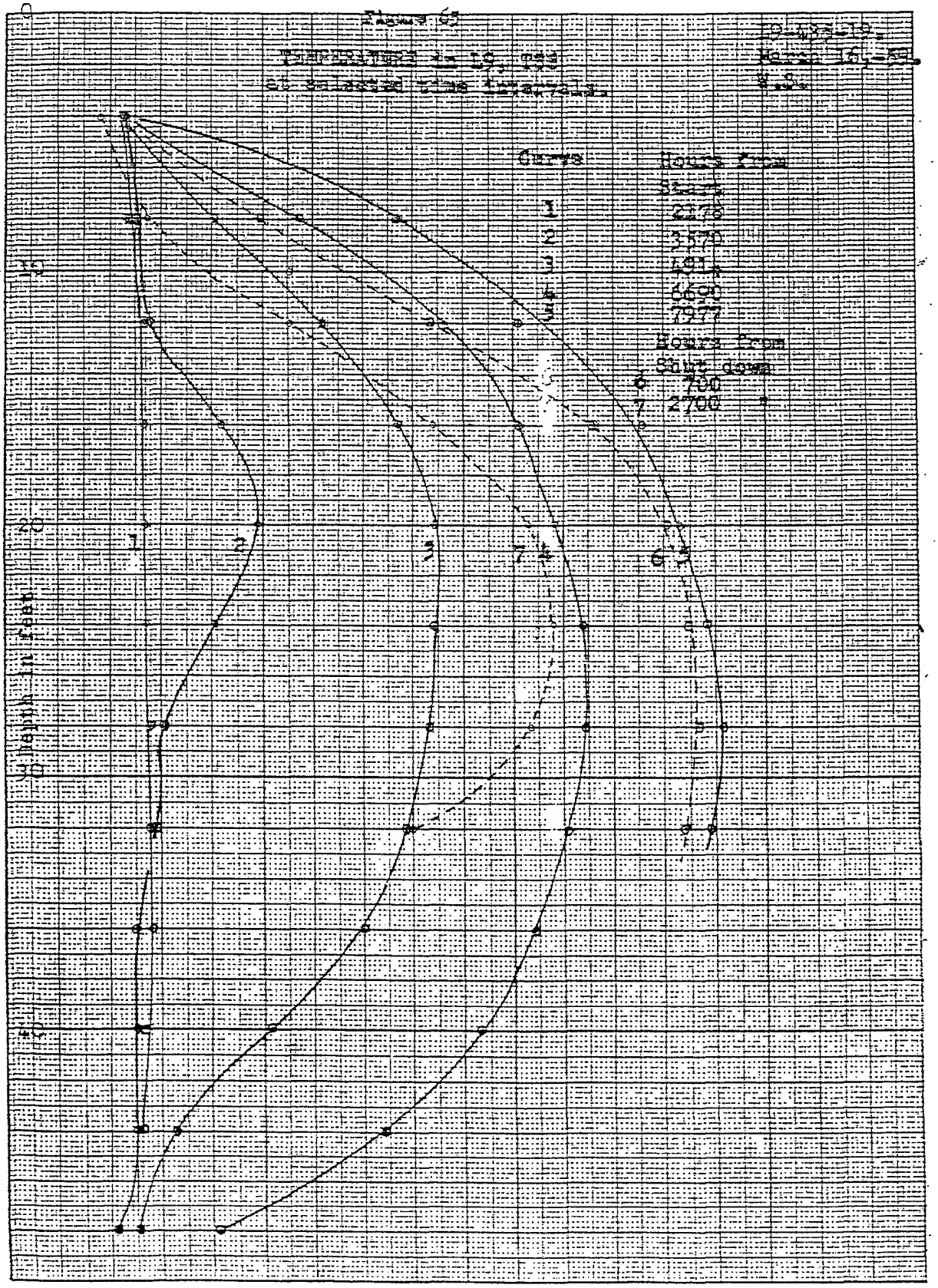
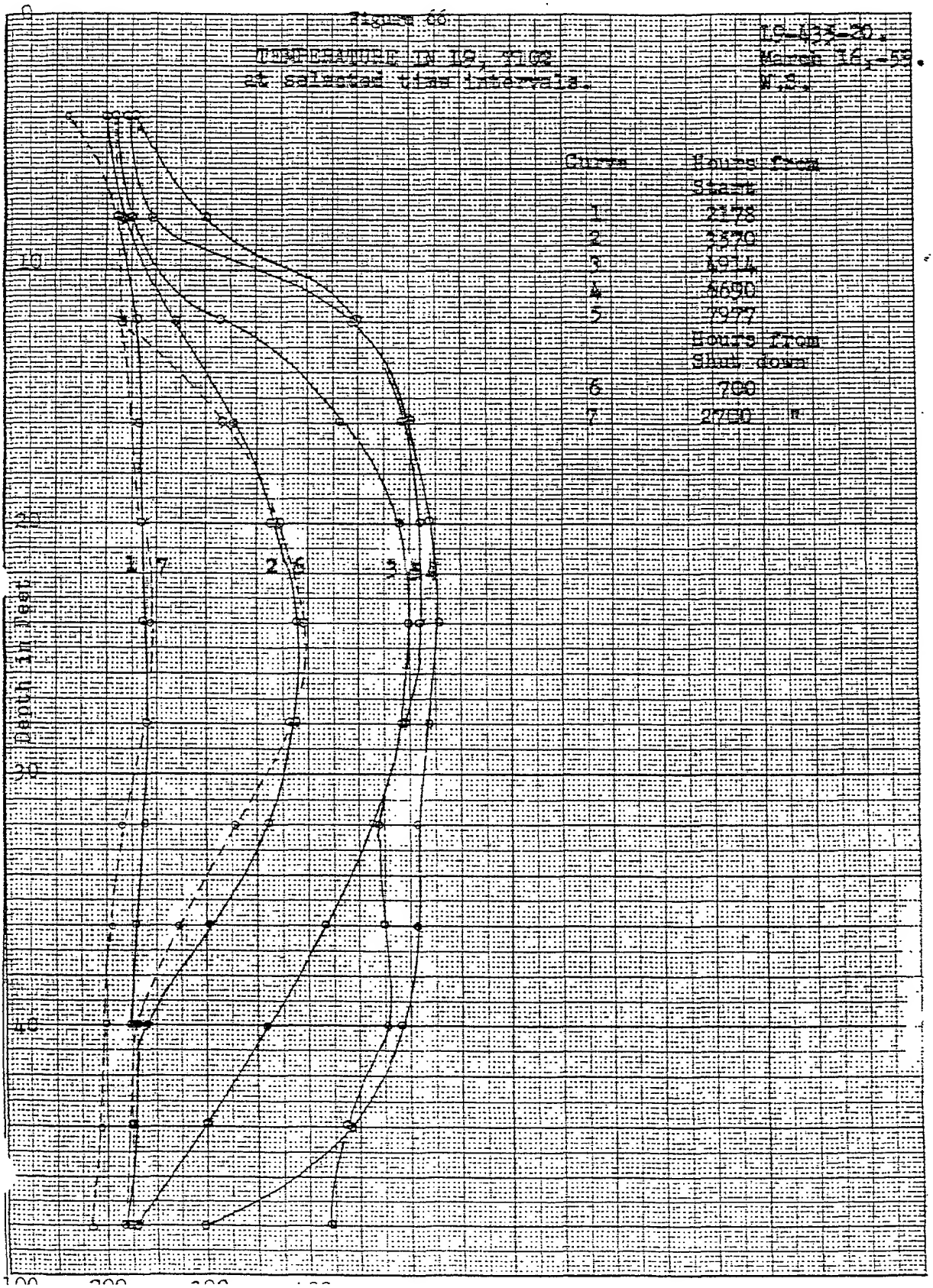
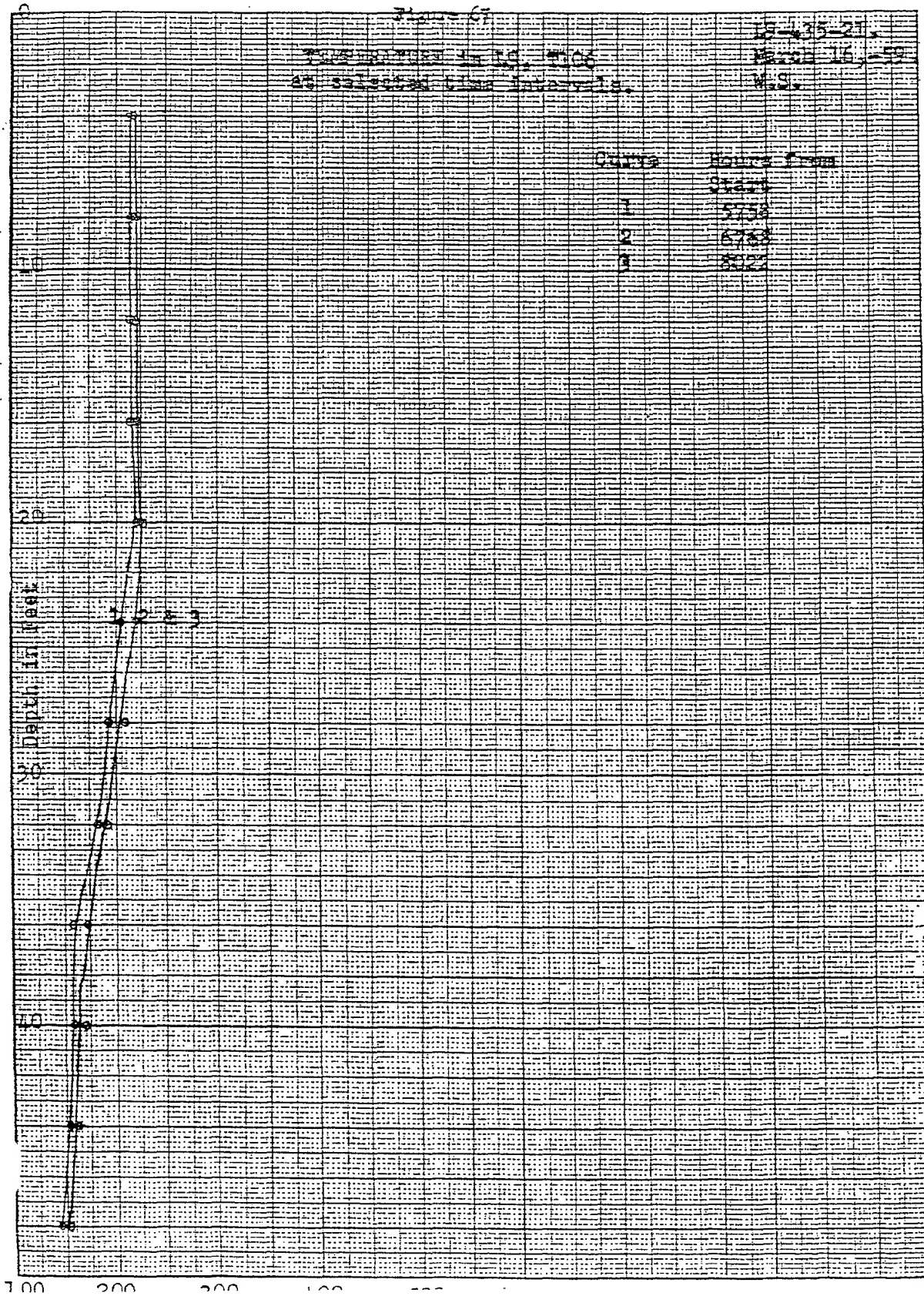

Curve
Hours from Start
1 2276
2 3570
3 4914
4 6600
5 7977
Hours from Start down
6 700
7 2700
10
20
30
40
Depth in feet

Figure 66.

TEMPERATURE IN 12, 1902
at selected time intervals.

T.S.-433-20.
Meter 16,-58
W.S.




Quarts
Hours from Start
1
2
3
1 2 & 3
Depth in Feet
10
20
30
40
100
200
300

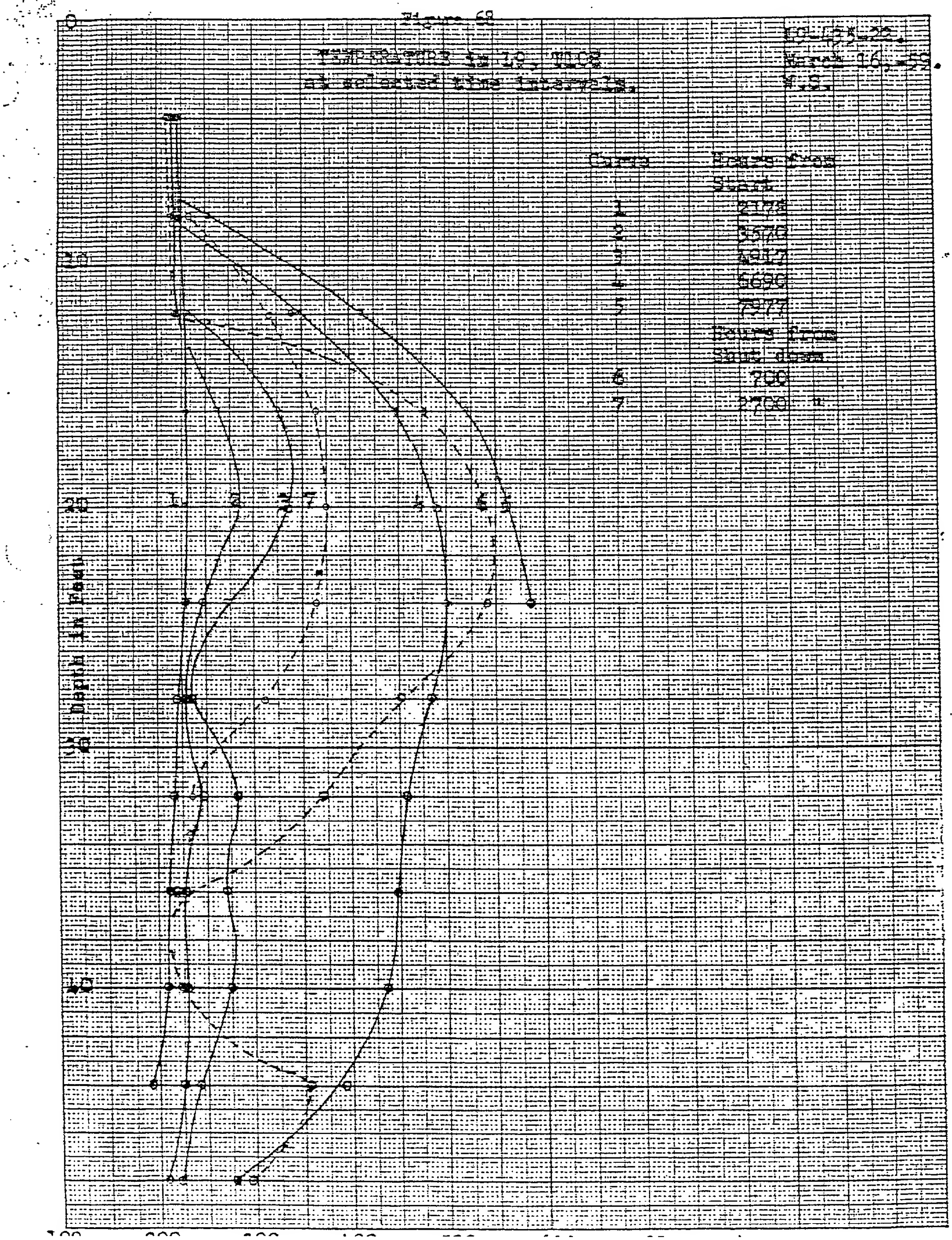
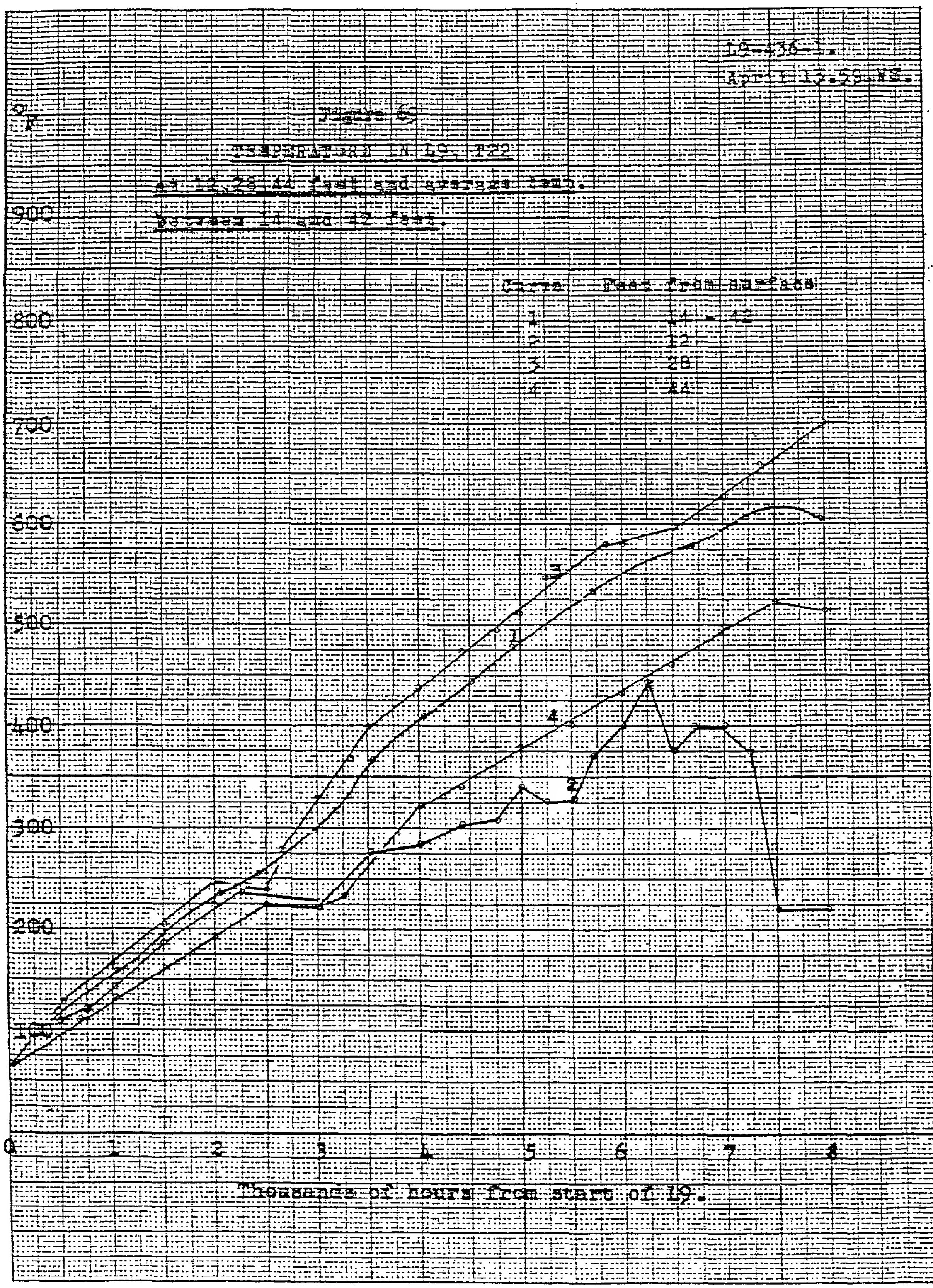


Figure 68
at selected time intervals.
Curve
Hours from Start
1 2178
2 3570
3 4917
4 5690
5 7977
Hours from Shut down
6 700
7 2700
Depth in Feet
0
20
40


L9-436-1.
April 13.59.WS.
TEMPERATURE IN L9. T22
at 12, 28, 44 feet and average temp.
between 14 and 42 feet.
Curve Feet from surface
1 14 - 42
2 12
3 28
4 44
°F
900
800
700
600
500
400
300
200
100
1
2
3
4
0
1
2
3
4
5
6
7
8
Thousands of hours from start of L9.

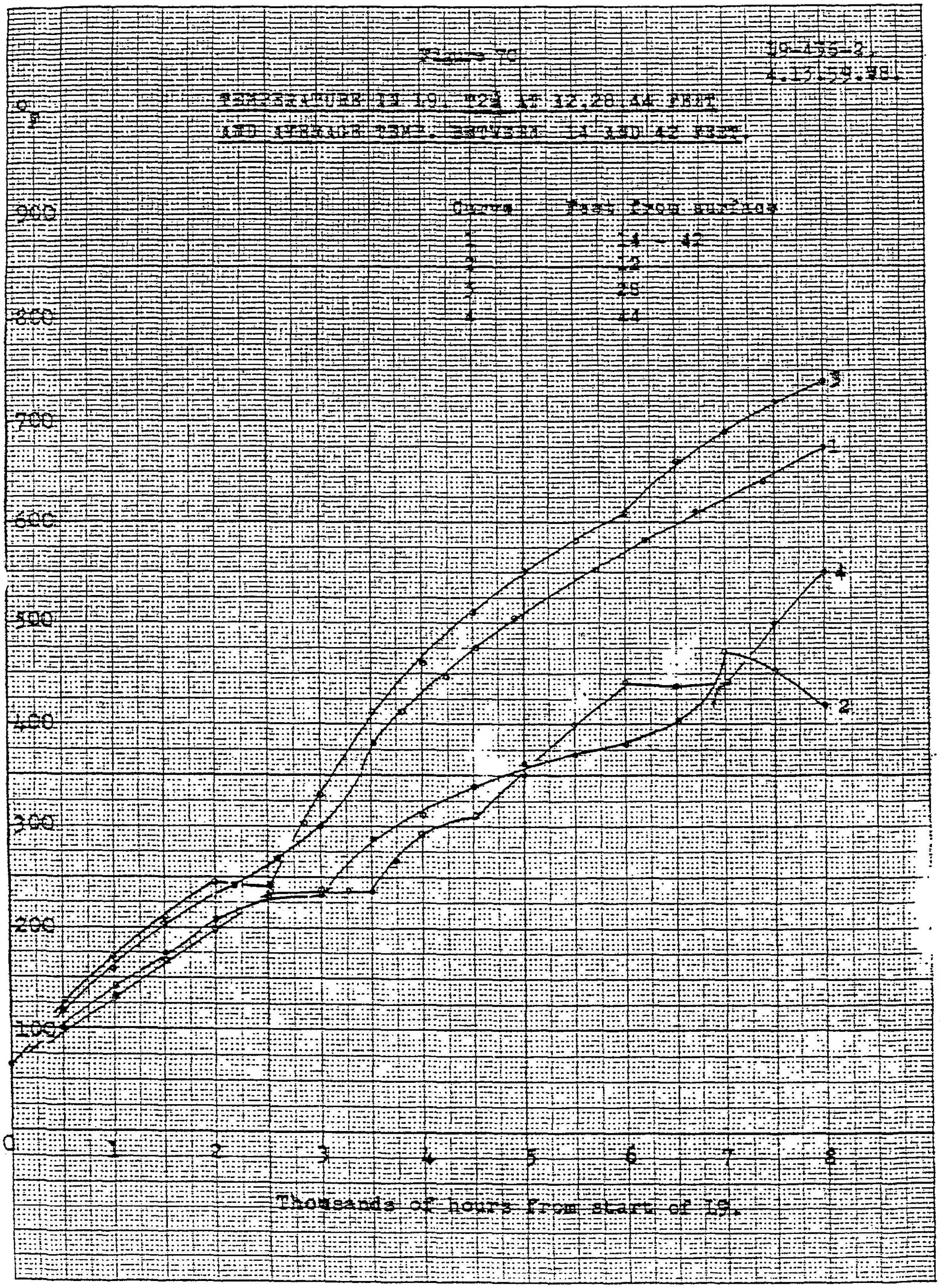
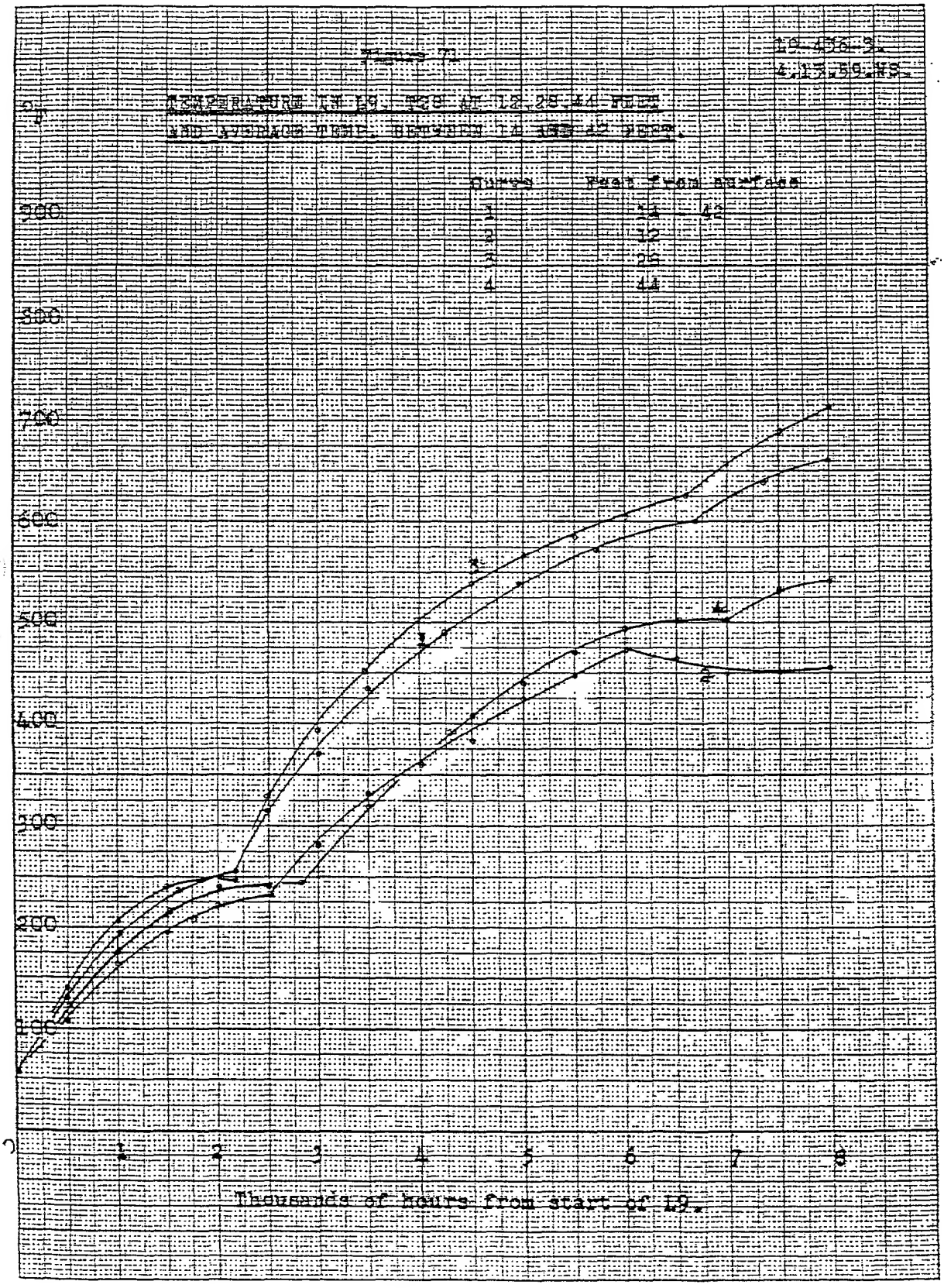
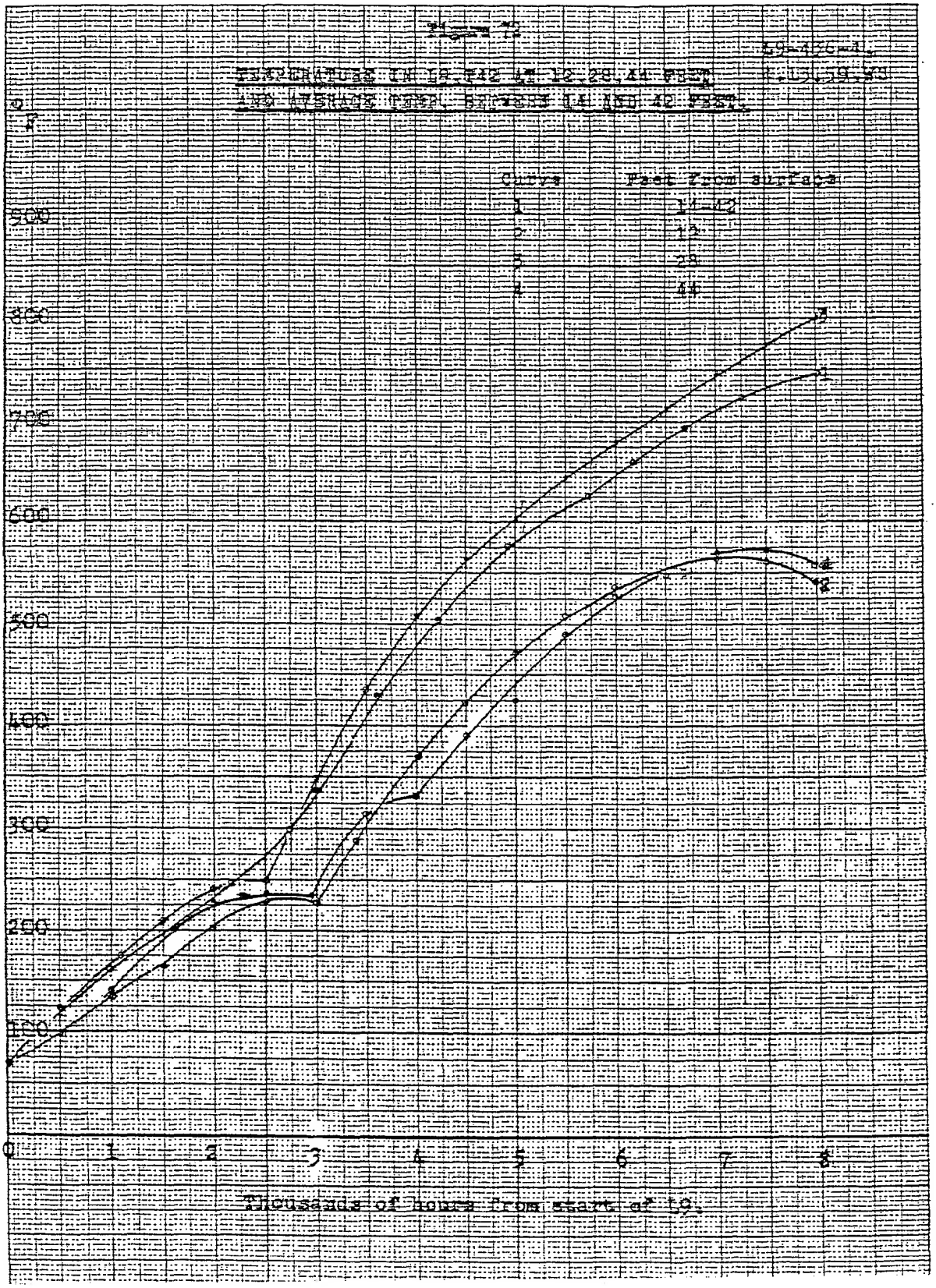

TEMPERATURE IN 19. AT 12,28,44 FEET
AND AVERAGE TEMP. BETWEEN 14 AND 42 FEET.
°F
Curve Feet from surface
1 14 - 42
2 12
3 28
4 44
900
800
700
600
500
400
300
200
100
0
1
2
3
4
5
6
7
8
Thousands of hours from start of 19.

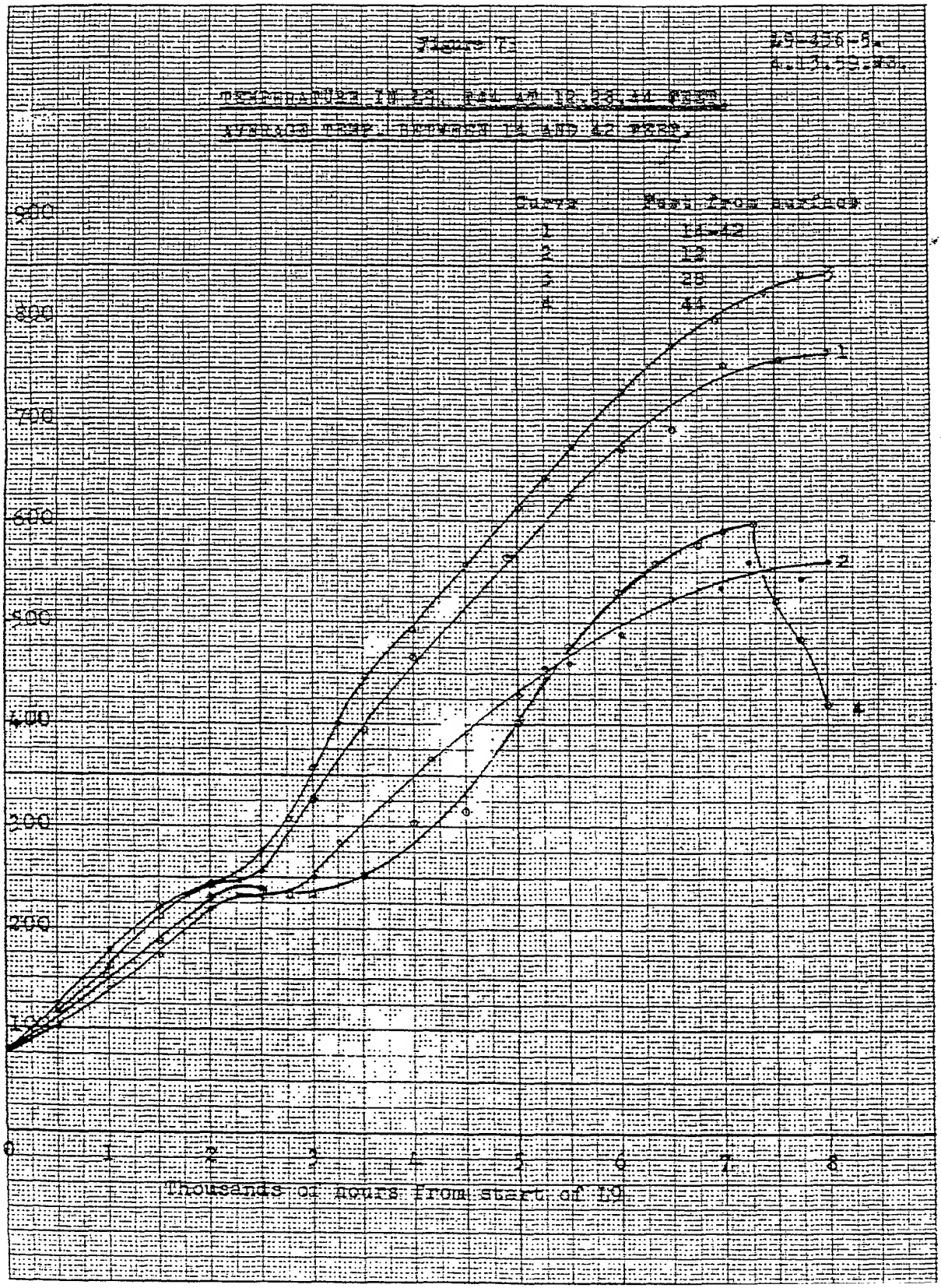
Fig. 73.

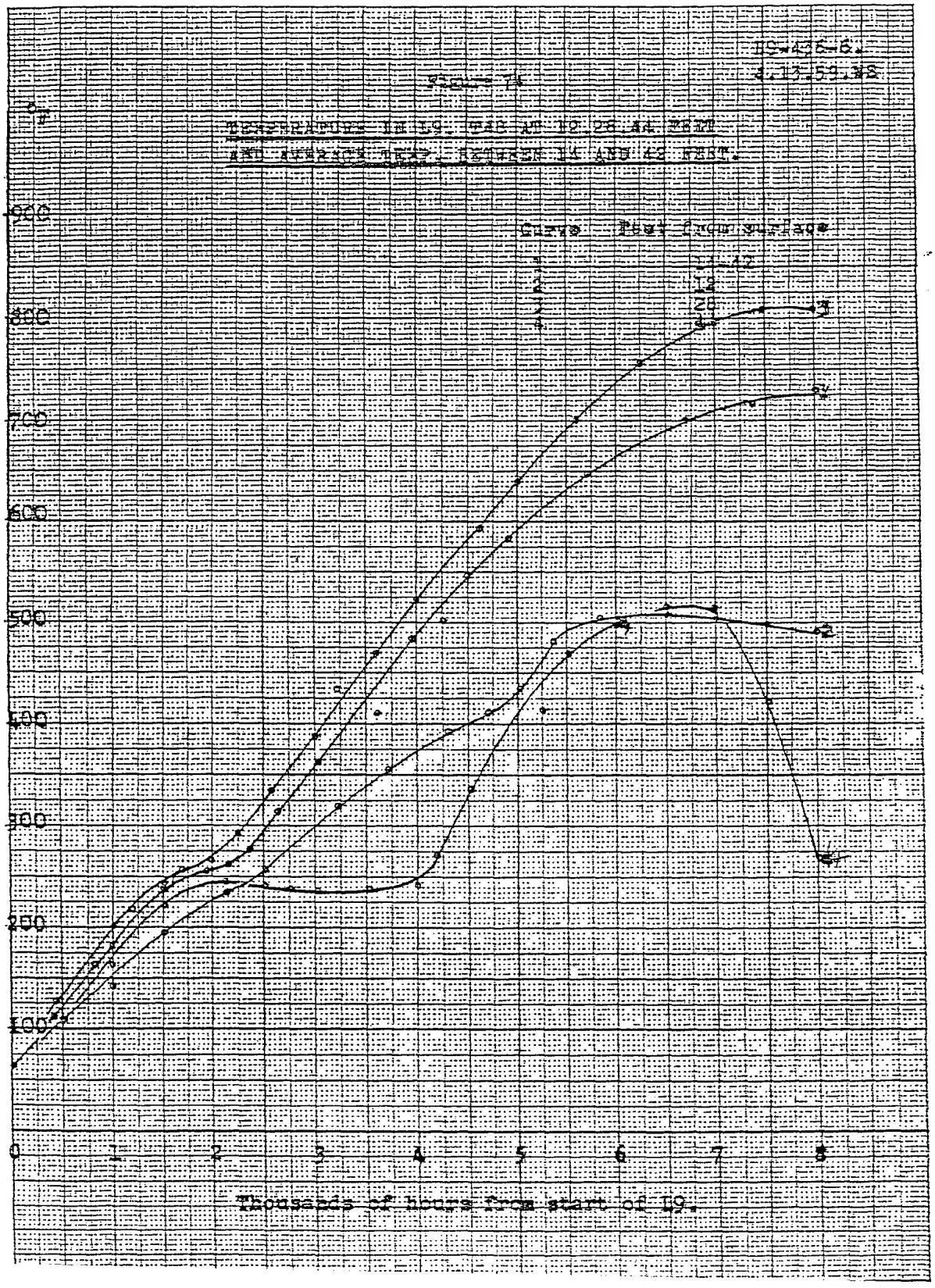
TEMPERATURE IN 19" PIPE AT 12.28.44 FEET
AND AVERAGE TEMP. BETWEEN 12 AND 42 FEET.

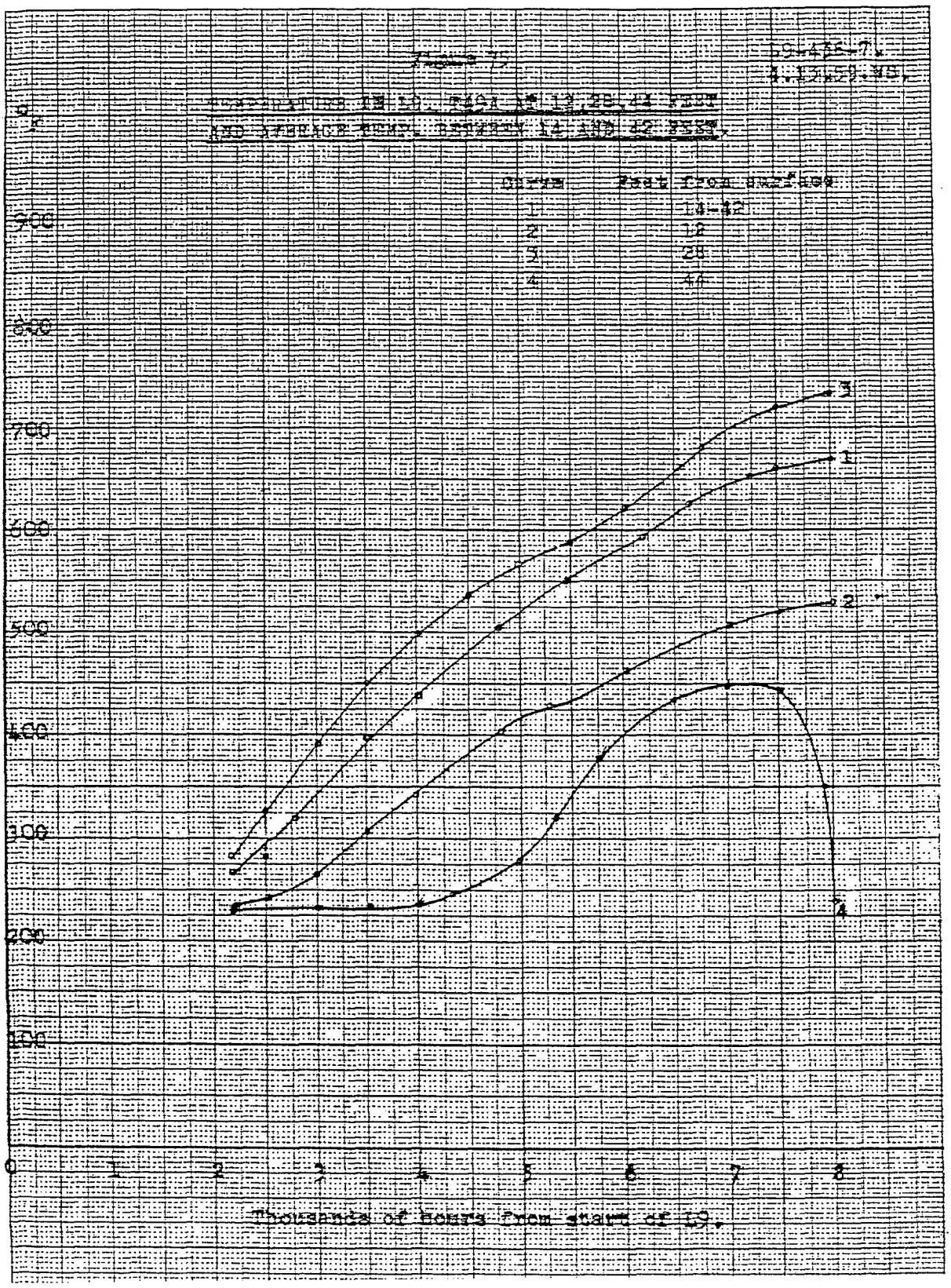
Curve	Feet from surface	
1	12	42
2	12	
3	25	
4	44	




Curve
Feet from surface
1
14-42
2
12
3
28
4
44
900
800
700
600
500
400
300
200
100
0
1
2
3
4
5
6
7
8
Thousands of hours from start of test.


Curve
Peak Iron anxiety
1
14-42
2
12
3
28
4
44
900
800
700
600
500
400
300
200
100
0
1
2
3
4
5
6
7
8
Thousands of hours from start of IQ


Curve Feet from surface
Thousands of hours from start of 19.
0
1
2
3
4
5
6
7
8
100
200
300
400
500
600
700
800
900



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MILLIMETER

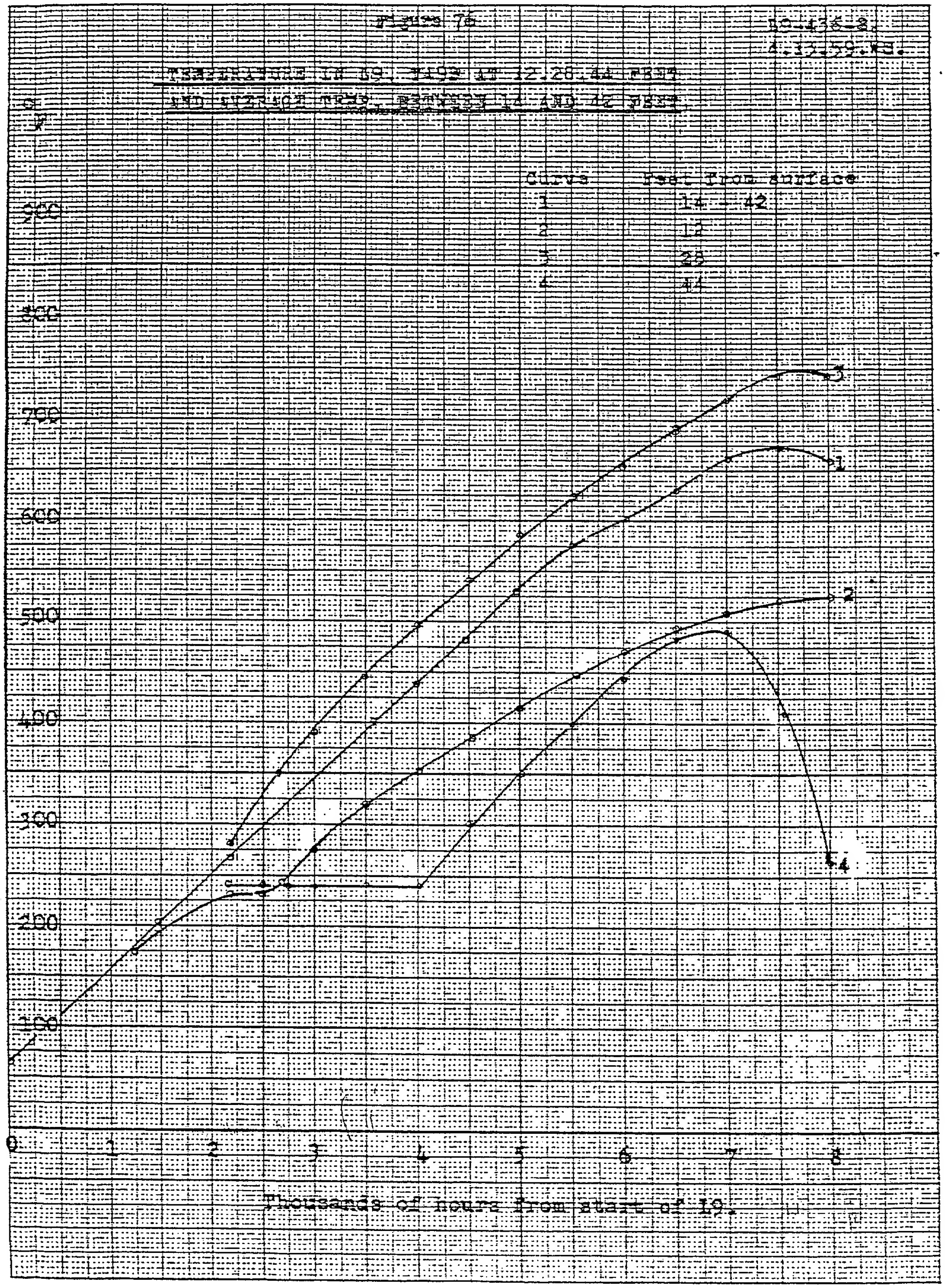


Figure 76
TEMPERATURE IN 19, F192 AT 12,28,44 FEET
AND AVERAGE TEMP. BETWEEN 14 AND 42 FEET
°F
Curve
Feet from surface
1
14 - 42
2
12
3
28
4
44
900
800
700
600
500
400
300
200
100
0
1
2
3
4
5
6
7
8
Thousands of hours from start of 19.

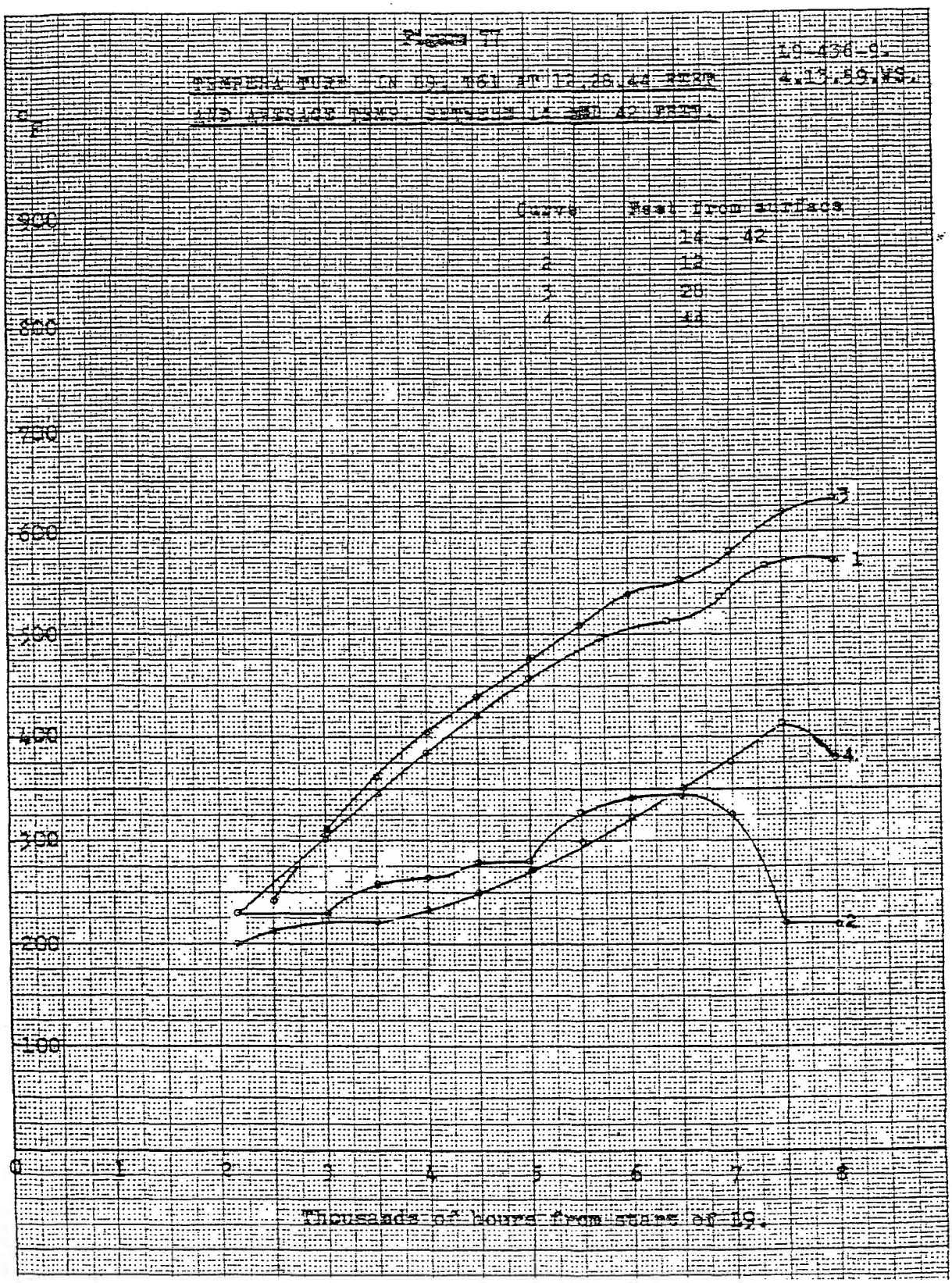

Curve
Feet from surface
1
14 - 42
2
12
3
20
4
14
1
2
3
4
900
800
700
600
500
400
300
200
100
0
1
2
3
4
5
6
7
8
Thousands of hours from start at 19.

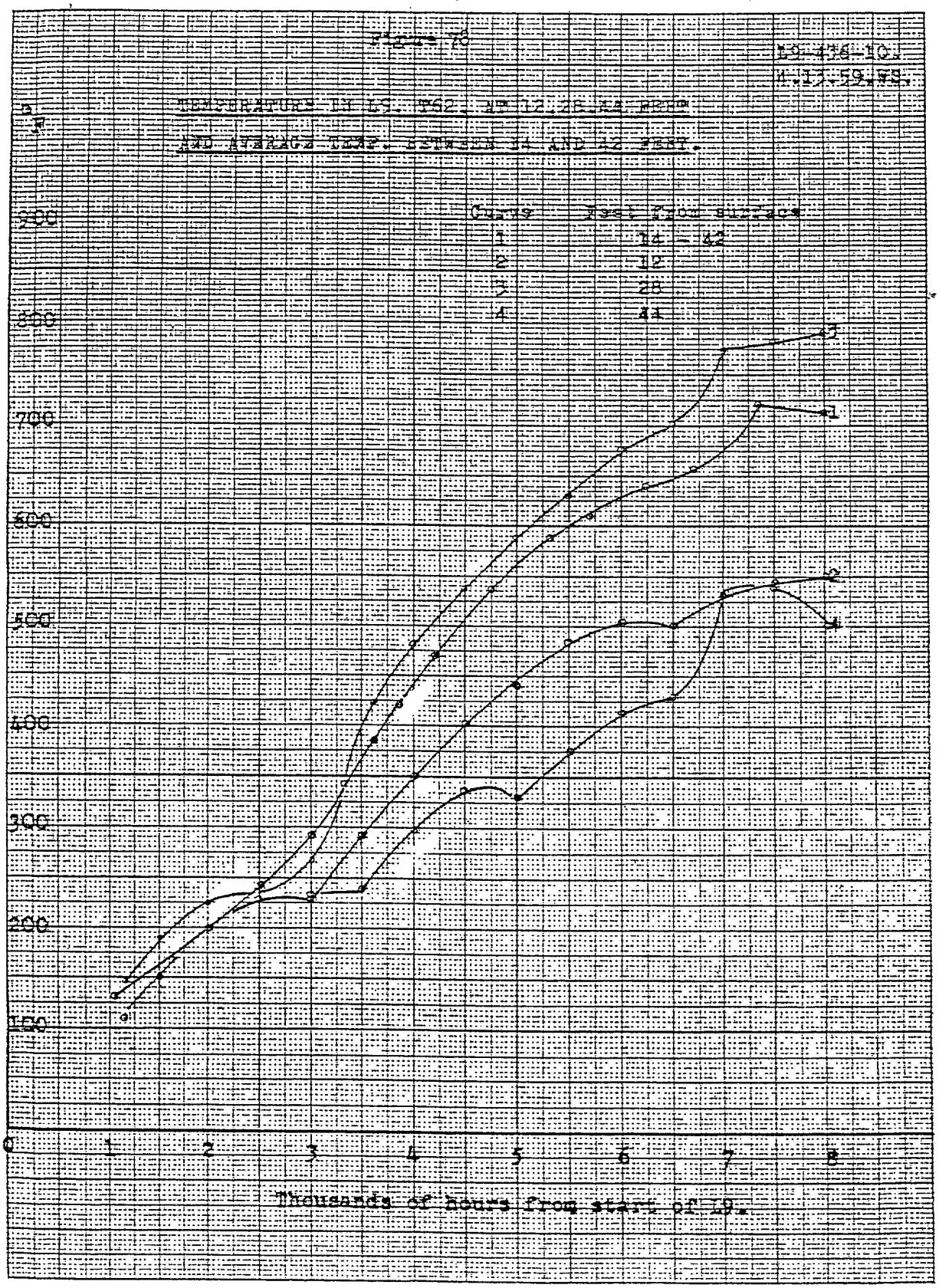
FIG. 78

59-436-10
4-17-59-FS.

TEMPERATURE IN LB. PER SQ. IN. ABS.

AND AVERAGE TEMP. BETWEEN 32 AND 52 FEET.

Curve	Feet from surface
1	14 - 42
2	12
3	28
4	41



PRINTED IN U. S. A.

MILLIMETER

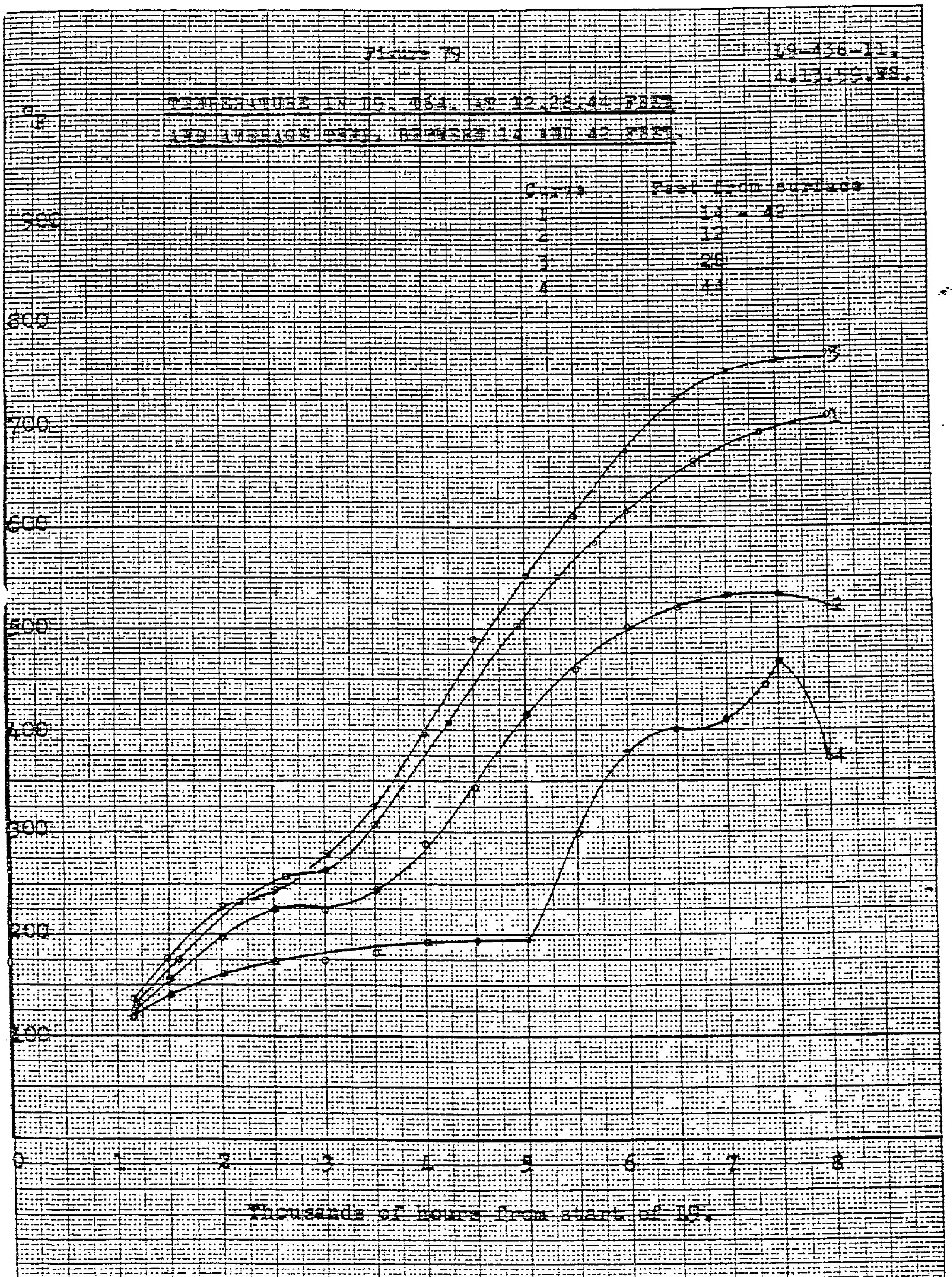

Curve
Feet from surface
1
14 - 42
2
12
3
28
4
44
900
800
700
600
500
400
300
200
100
0
1
2
3
4
5
6
7
8
Thousands of hours from start of 19.

Figure 80

LG-436-12.
4.12.59.MS.

TEMPERATURE IN LG. T68 AT 12.28.42 PEST AND AVERAGE TEMP. BETWEEN 14 AND 42 FEET.

Curve	Feet from surface
1	14 - 42
2	12
3	28
4	44

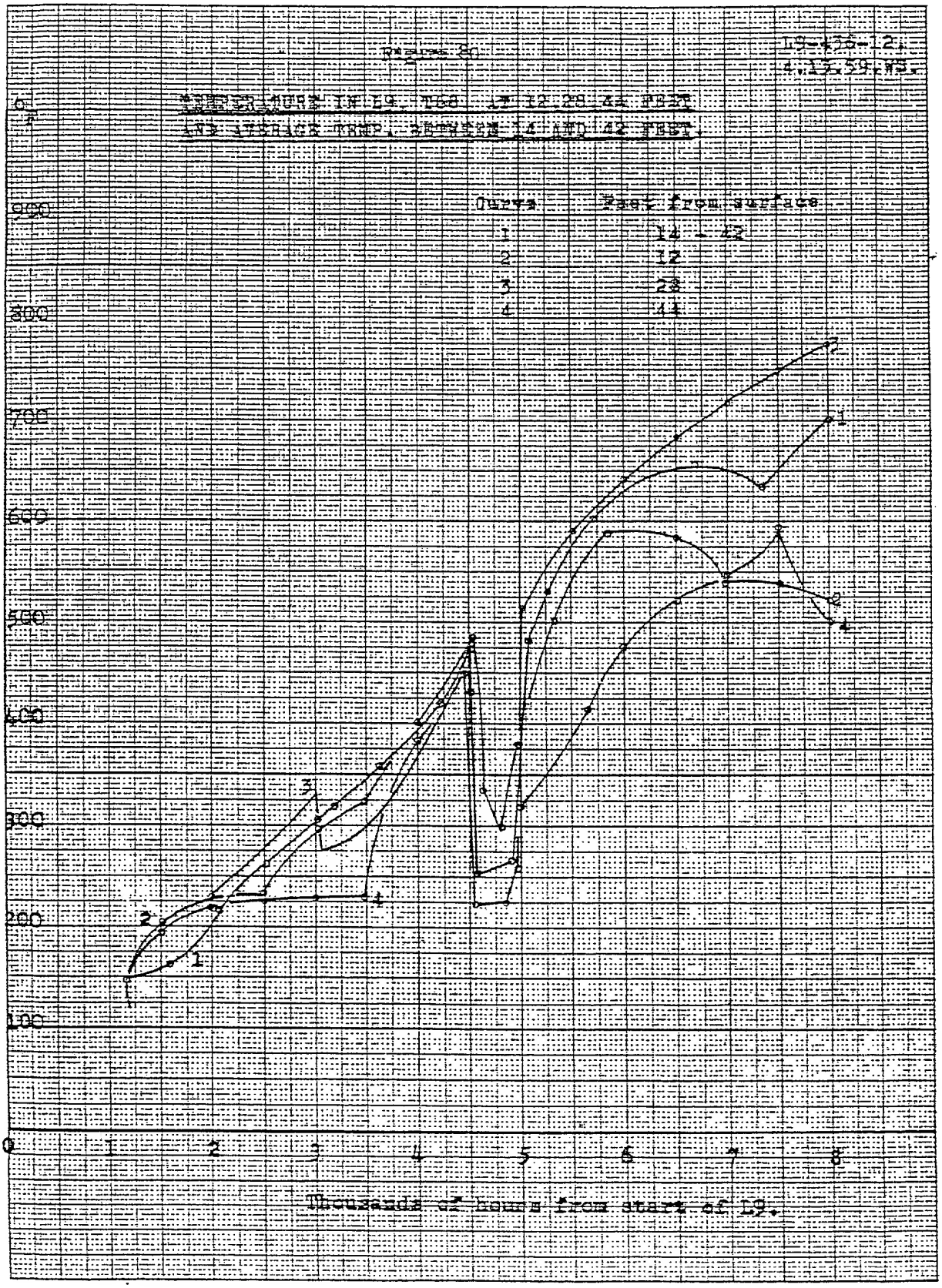
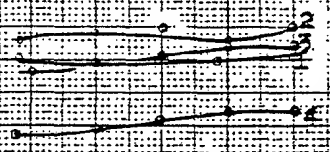


Figure 81.

TEMPERATURE IN EQ. SHAFT, AT 12,28, 44 FEET
AND AVERAGE PSEE. BETWEEN 14 AND 42 FEET.

Curve	Feet from surface
1	12 - 42
2	12
3	28
4	44



Thousands of hours from start of EQ.

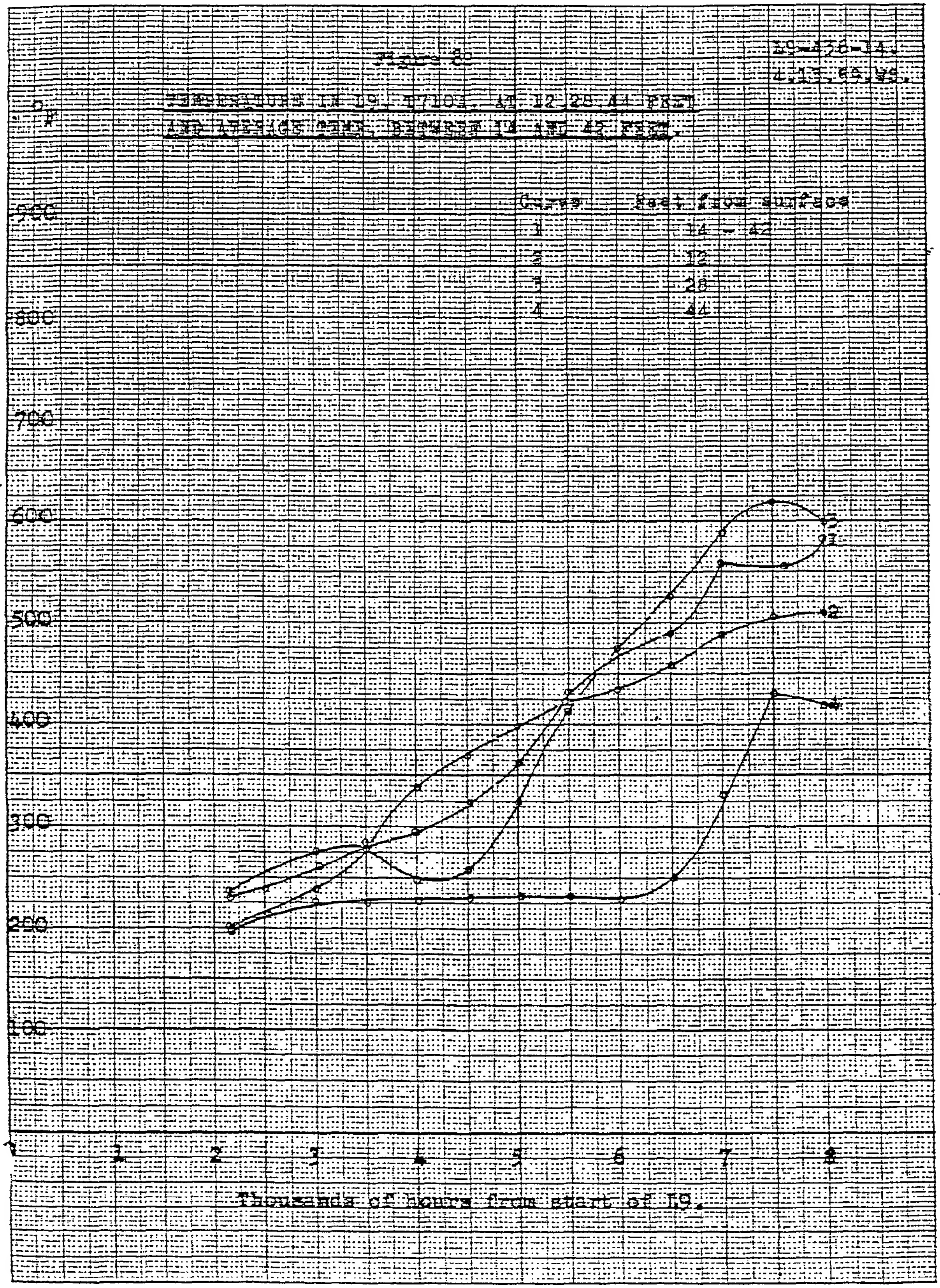


Figure 8
L9-436-14.
4,13,59,WS.
TEMPERATURE IN L9, T/101, AT 12,28,44 FEET
AND AVERAGE TEMP. BETWEEN 14 AND 42 FEET.
°F
Curve Feet from surface
1 14 - 42
2 12
3 28
4 44
900
800
700
600
500
400
300
200
100
0
1
2
3
4
5
6
7
8
Thousands of hours from start of L9.

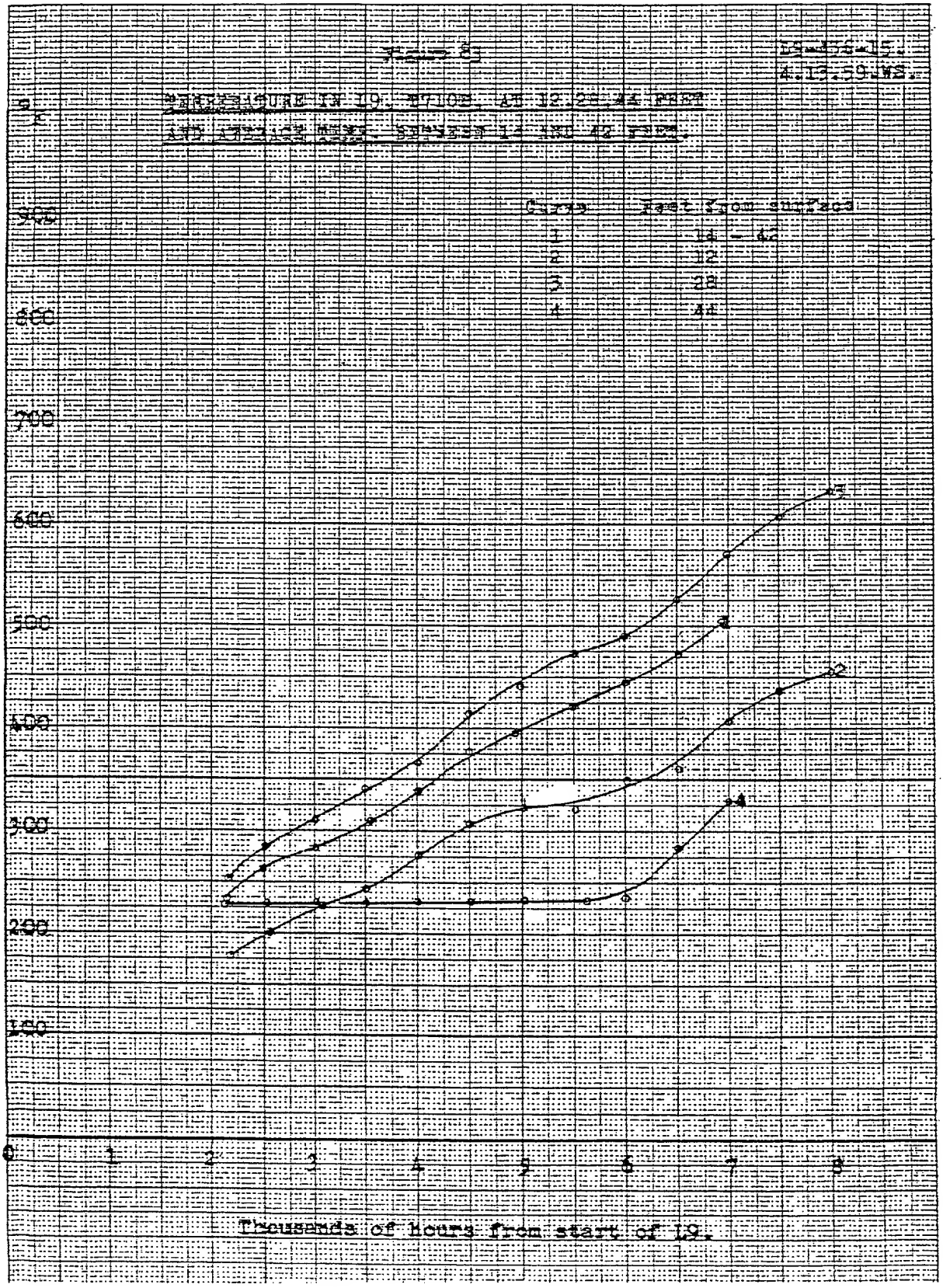
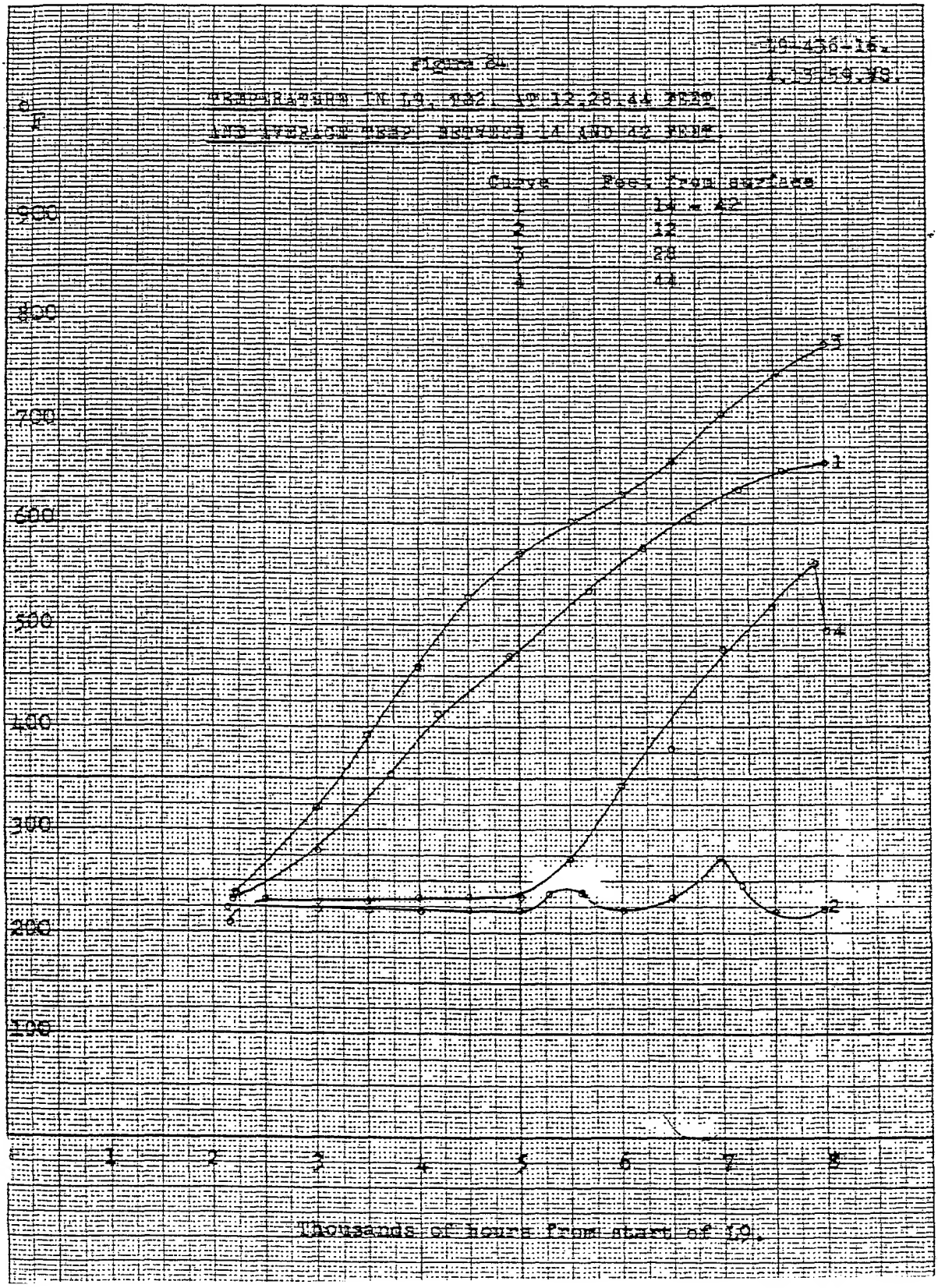

Curve
1
2
3
4
Feet from surface
14 – 42
12
28
44
Thousands of hours from start of 19.

Figure 24

16-436-16.
A-3.59-YS.

TEMPERATURE IN I.D. AT 12, 28, 44 FEET AND AVERAGE DEEP BOREHOLE AT 42 FEET.

Curve	Feet from surface
1	44
2	12
3	28
4	42



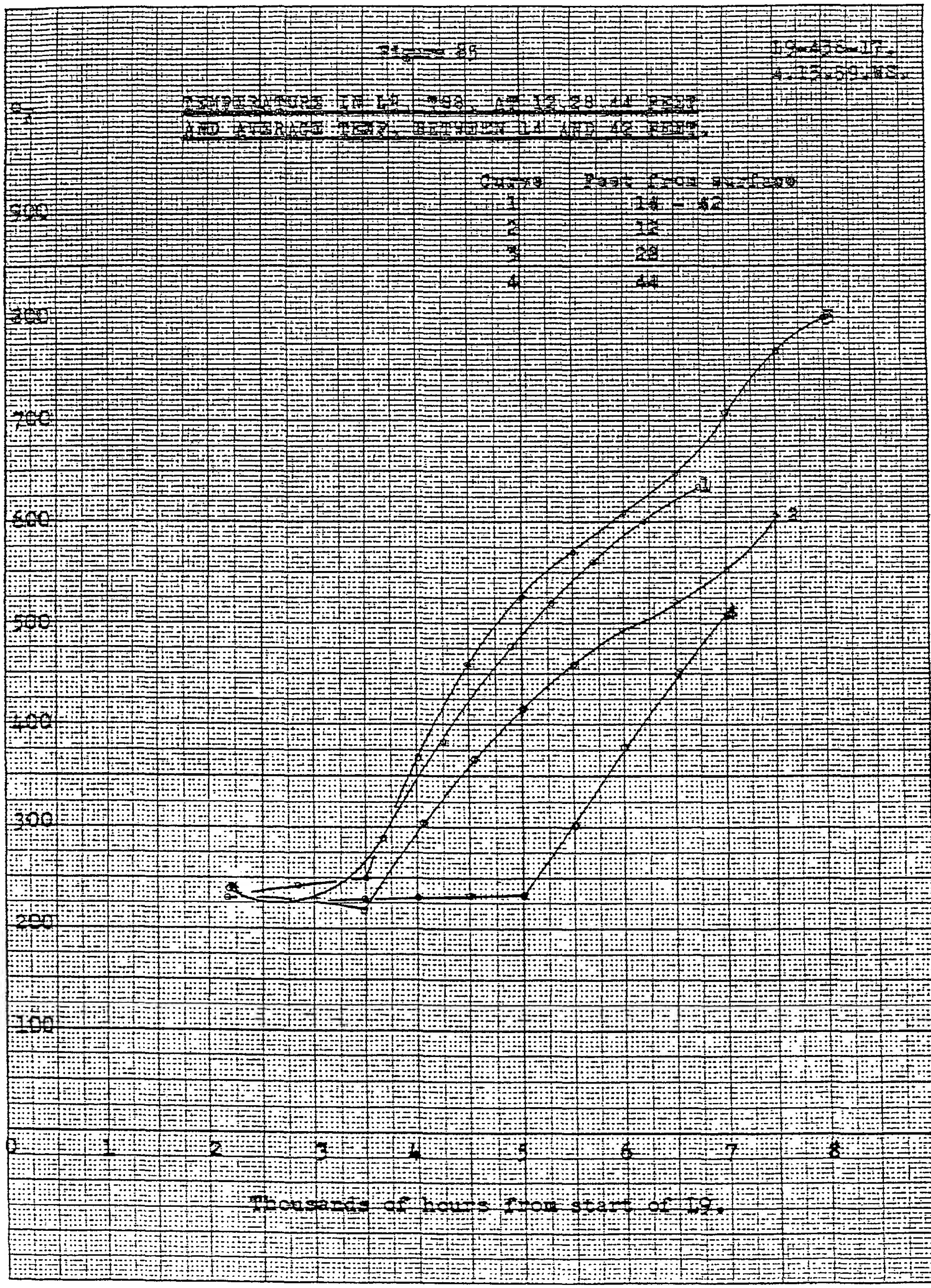
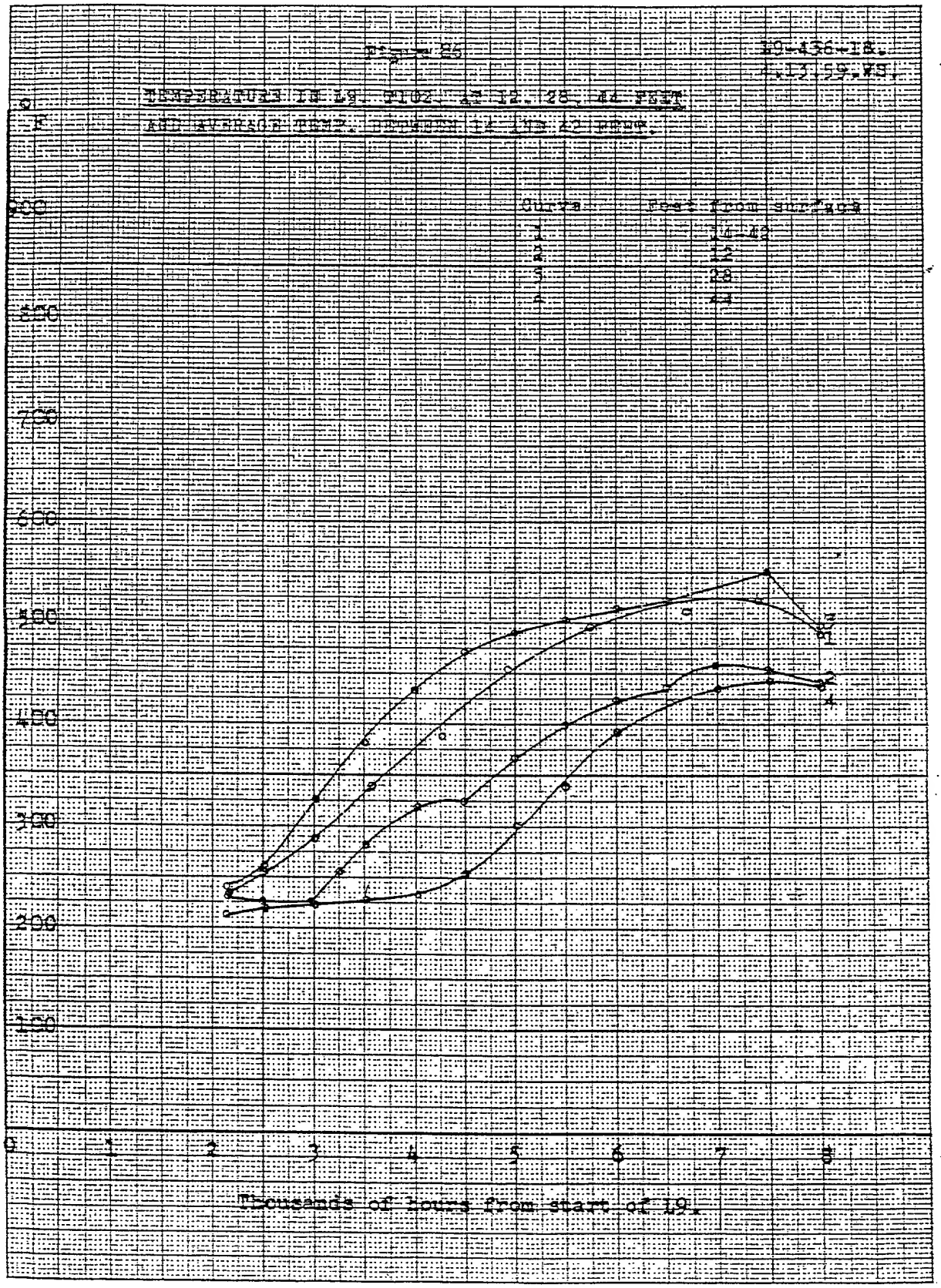
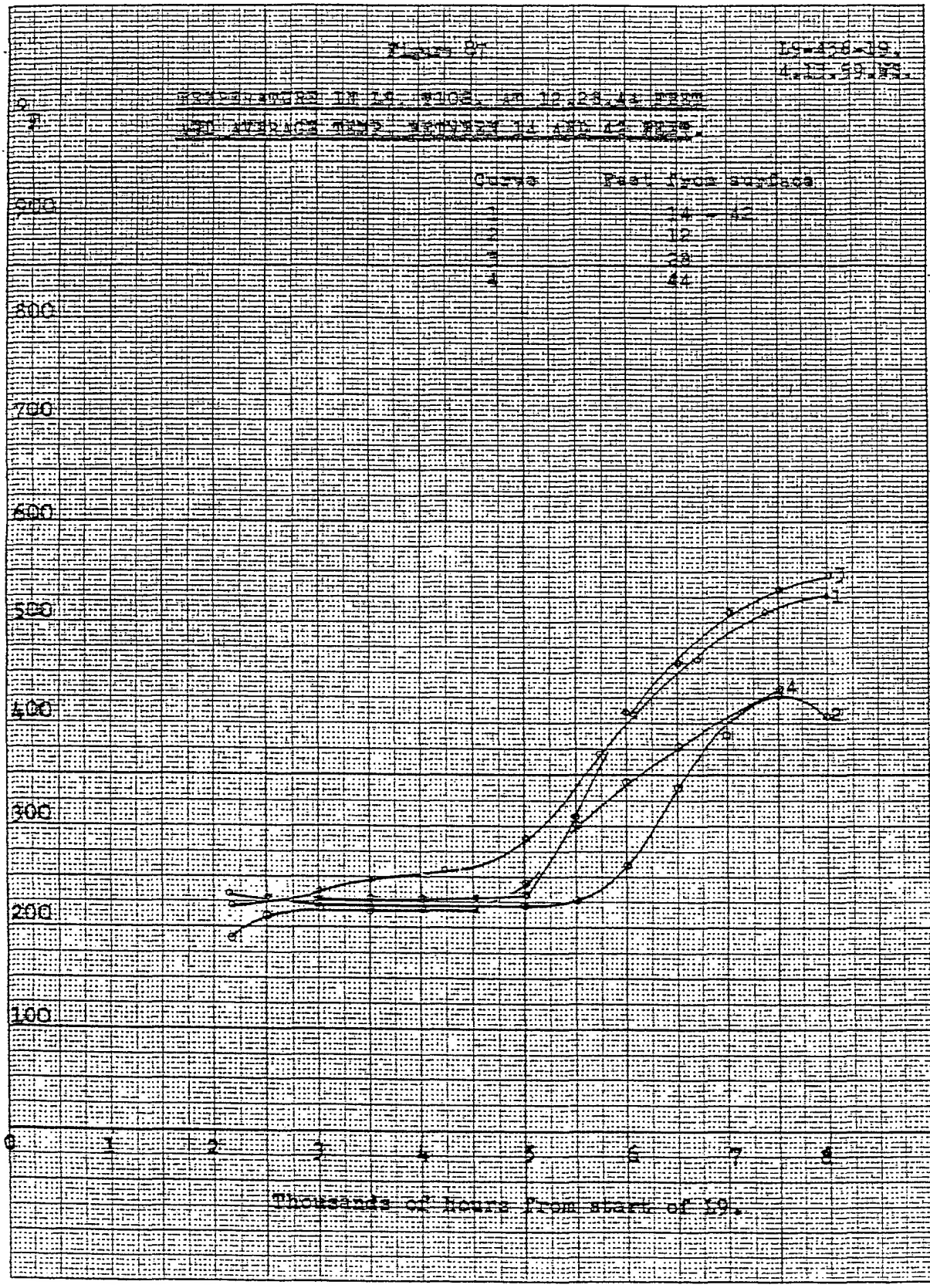


Figure 85
19-438-17.
4.15.59.MS.
TEMPERATURE IN LF. 798, AT 12,28,44 FEET
AND AVERAGE TEMP. BETWEEN 14 AND 42 FEET.
°F.
Curve Feet from surface
1 14 - 42
2 12
3 28
4 44
900
800
700
600
500
400
300
200
100
0 1 2 3 4 5 6 7 8
Thousands of hours from start of 19.


39-436-18,
4.12.59.WS.
TEMPERATURES IN 19 TUBE AT 12, 28, 44 FEET
AND AVERAGE TEMP. OF EARTH AT 100 FEET.
F
Curve
Feet from surface
1
2
3
4
14-42
12
28
44
600
500
400
300
200
100
0
1
2
3
4
5
6
7
8
Thousands of hours from start of 19.


Curve
Feet from surface
1
2
3
4
1-4 - 42
12
28
44
500
600
700
800
900
400
300
200
100
0
1
2
3
4
5
6
7
8
Thousands of Hours From start of 19.

L9-444
5-22-59 EP

Figure 88

AVERAGE TEMPERATURE AT 28 FEET AND 14 TO 42 FEET IN "INSIDE" TEMPERATURE WELLS
(#42, 45, 48, 62, 64, 68, 82, 88)

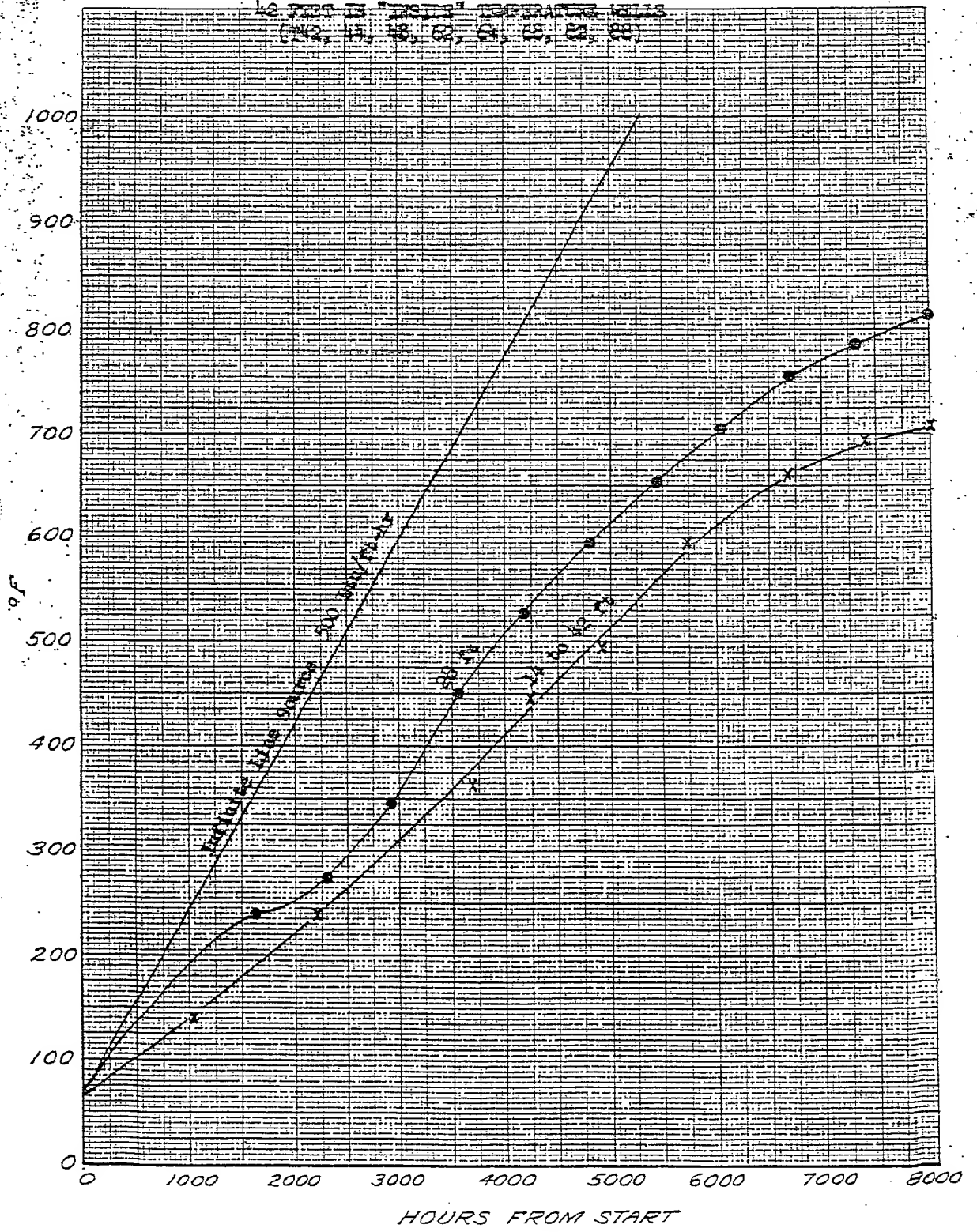
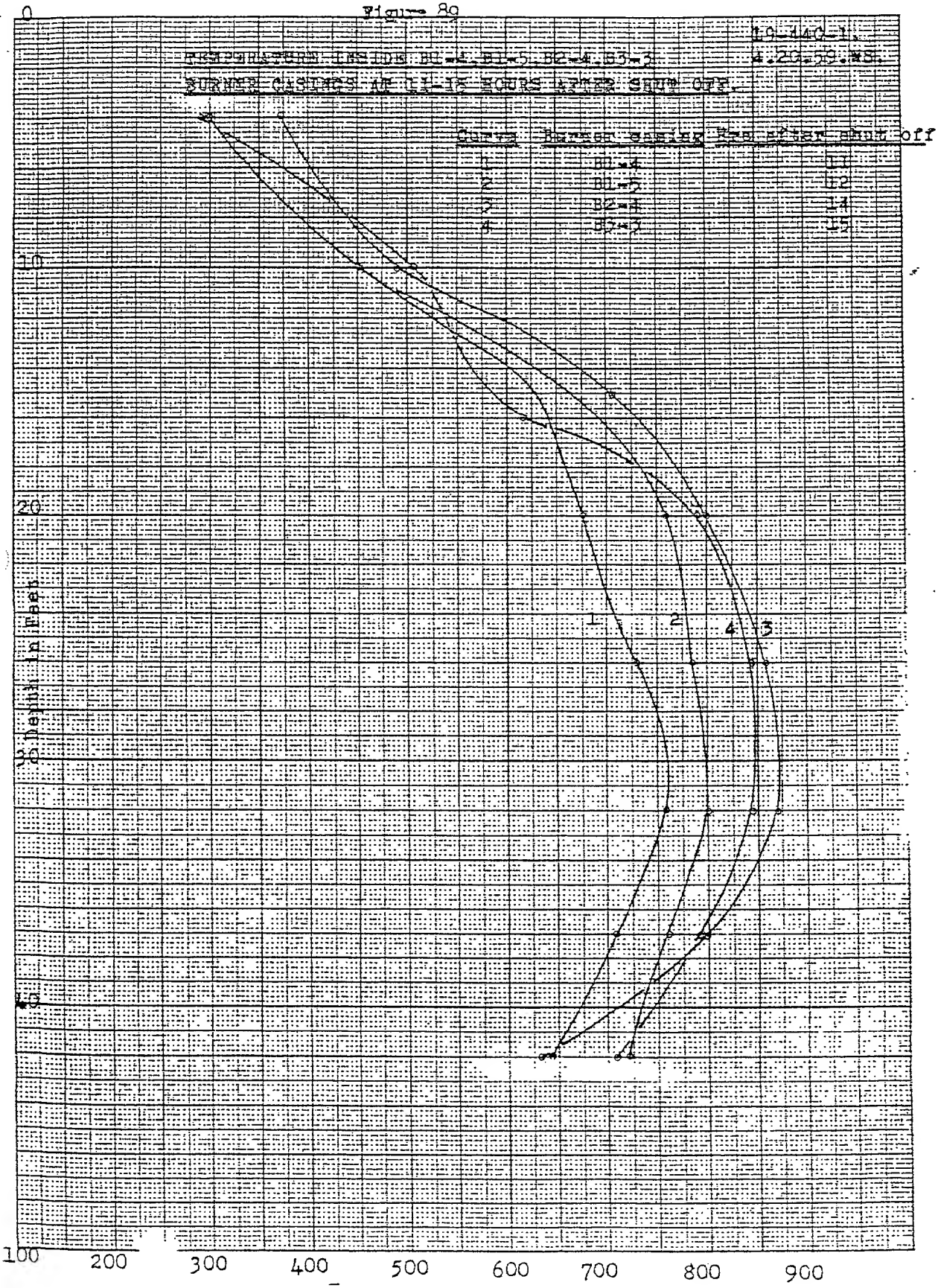


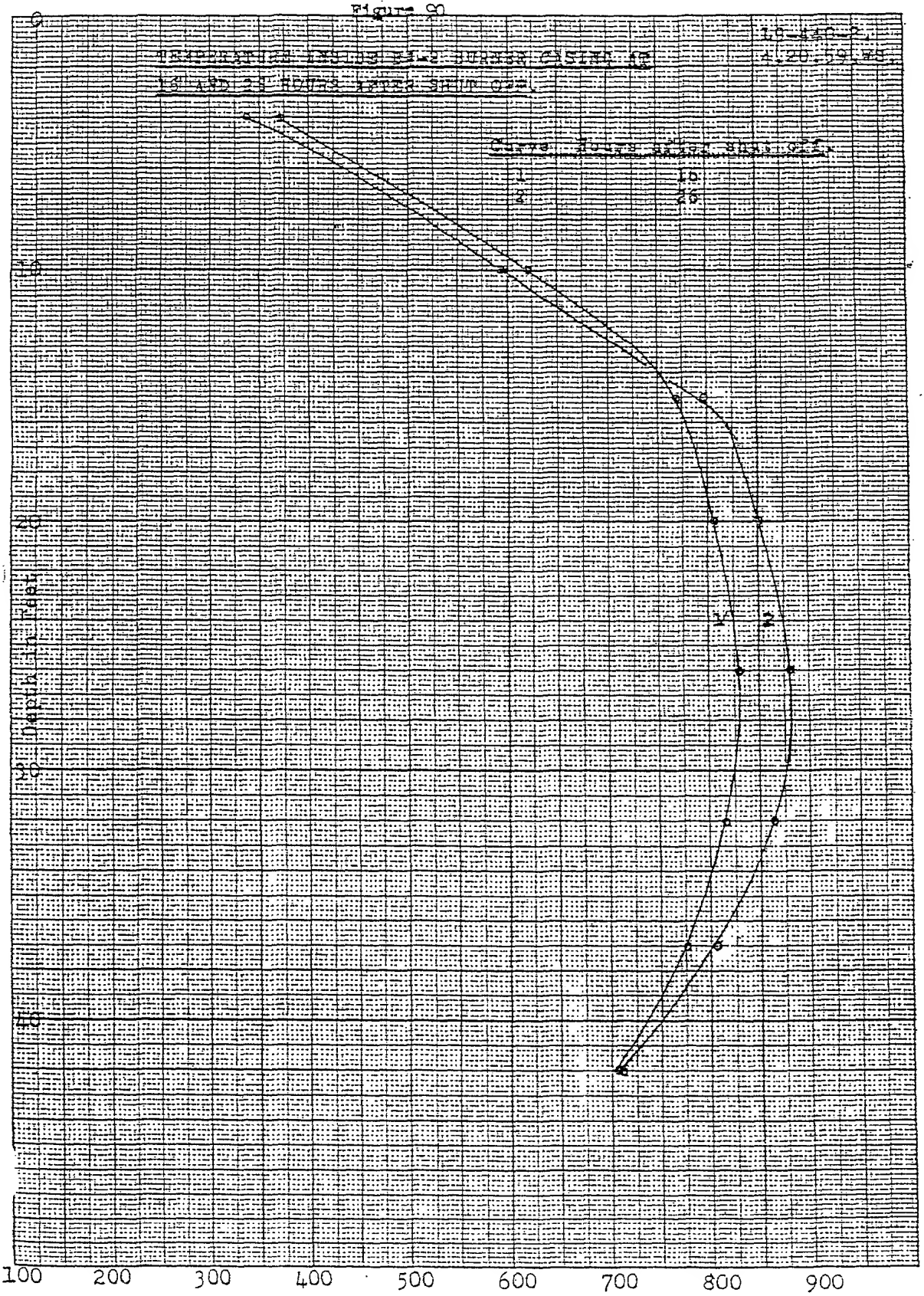
Figure 89



TEMPERATURE LOGS IN BU-4, BU-5, B2-4, B3-3 BURNER CASINGS AT 11-15 HOURS AFTER SHUT OFF.

T9-440-1, 4.20-59.MS.

Figure 8


TEMPERATURE TRACES BELOW BURNER CASING AT 16' AND 24' HOURS AFTER SHUT OFF.
Curve Hours after shut off.
1 16
2 24
Depth in Feet
0
10
20
30
40
100
200
300
400
500
600
700
800
900

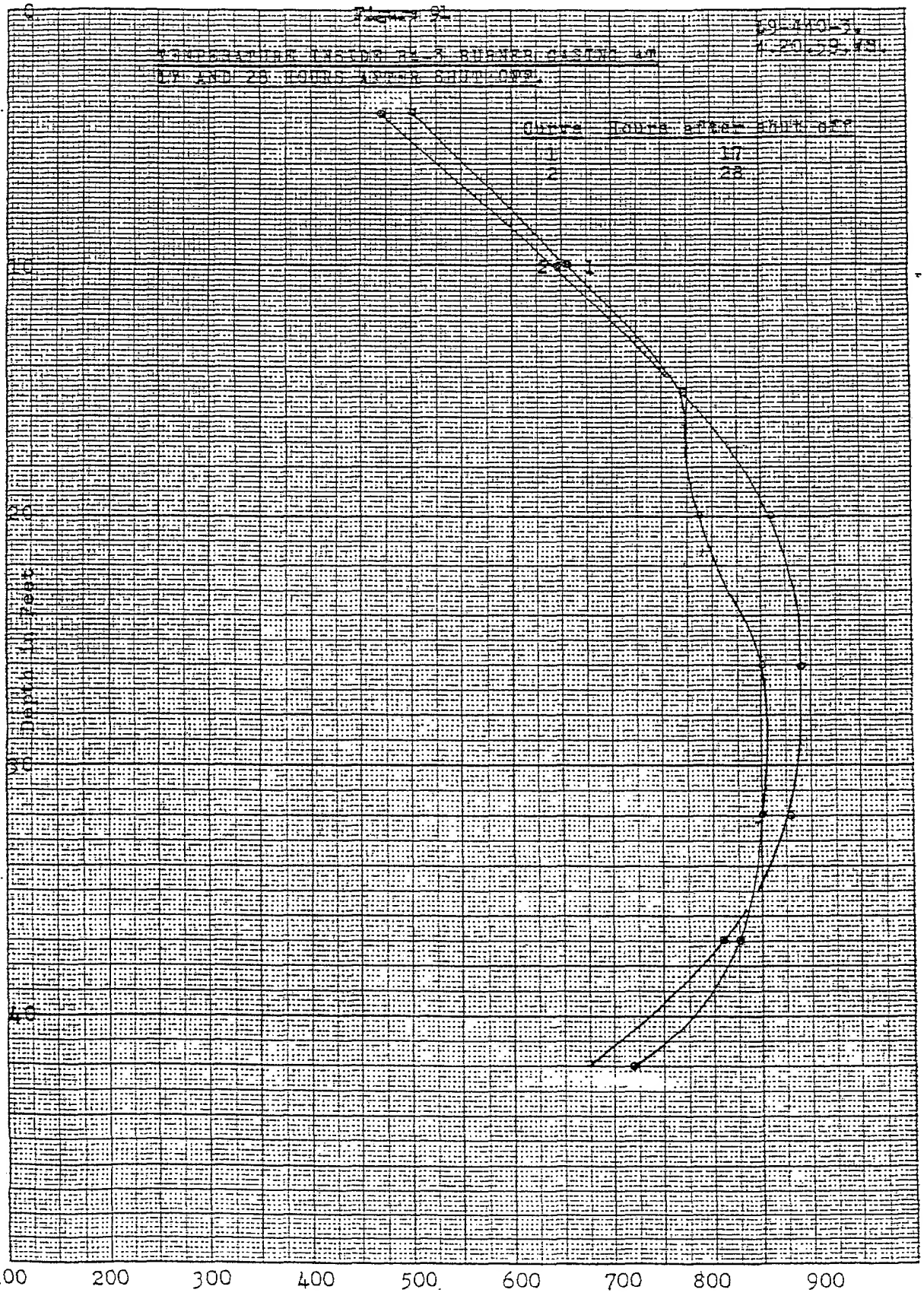
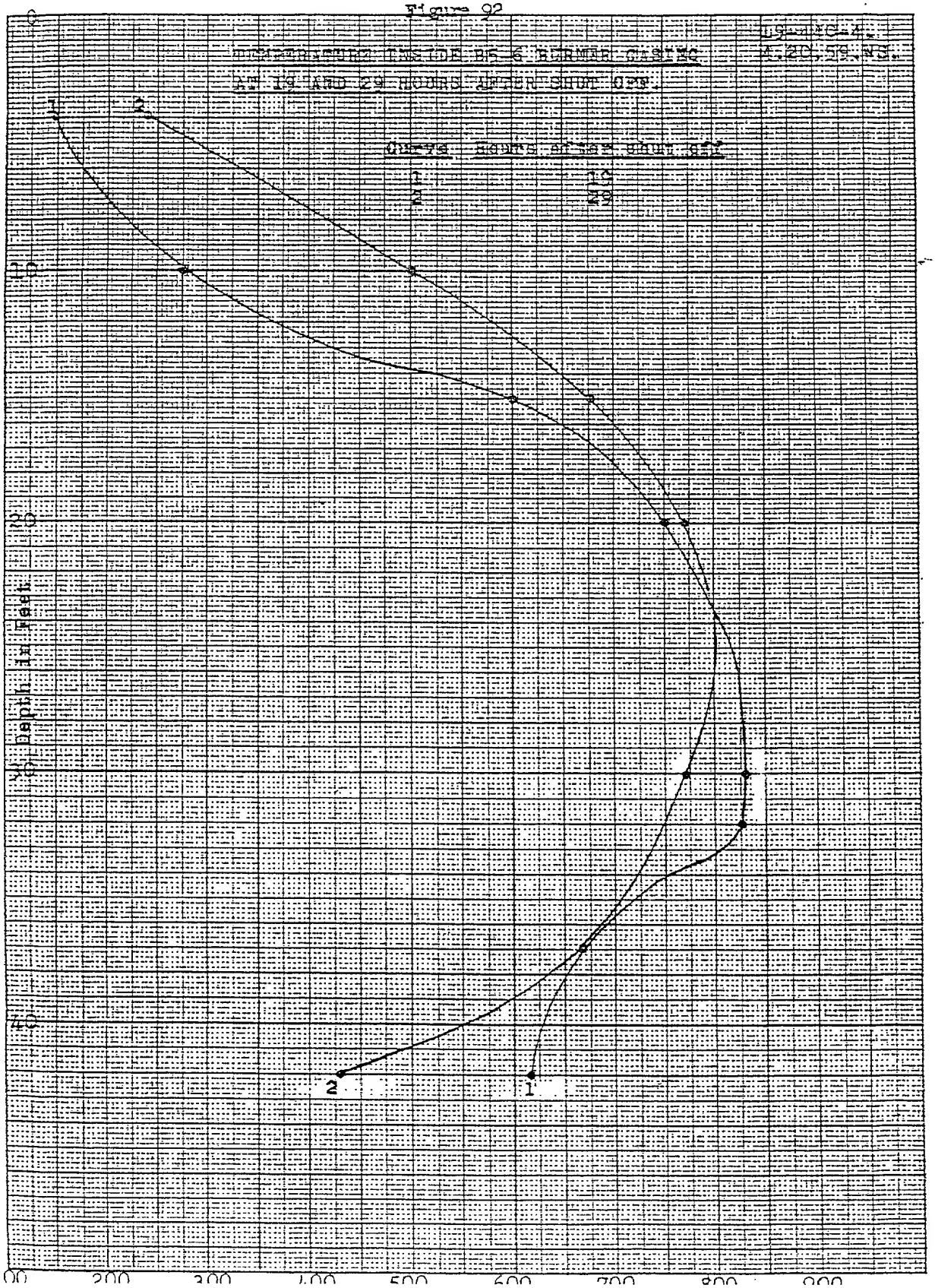


Figure 21
TEMPERATURE TESTS AT 3 BURNER SYSTEM AT
17 AND 28 HOURS AFTER SHUT OFF.
Curve Hours after shut off
1 17
2 28
Depth in feet
10
20
30
40
100
200
300
400
500
600
700
800
900

Figure 92


Curve Hours after shut off
1 19
2 29
Depth in Feet
40
60
80
100
200
300
400
500
600
700
800
900

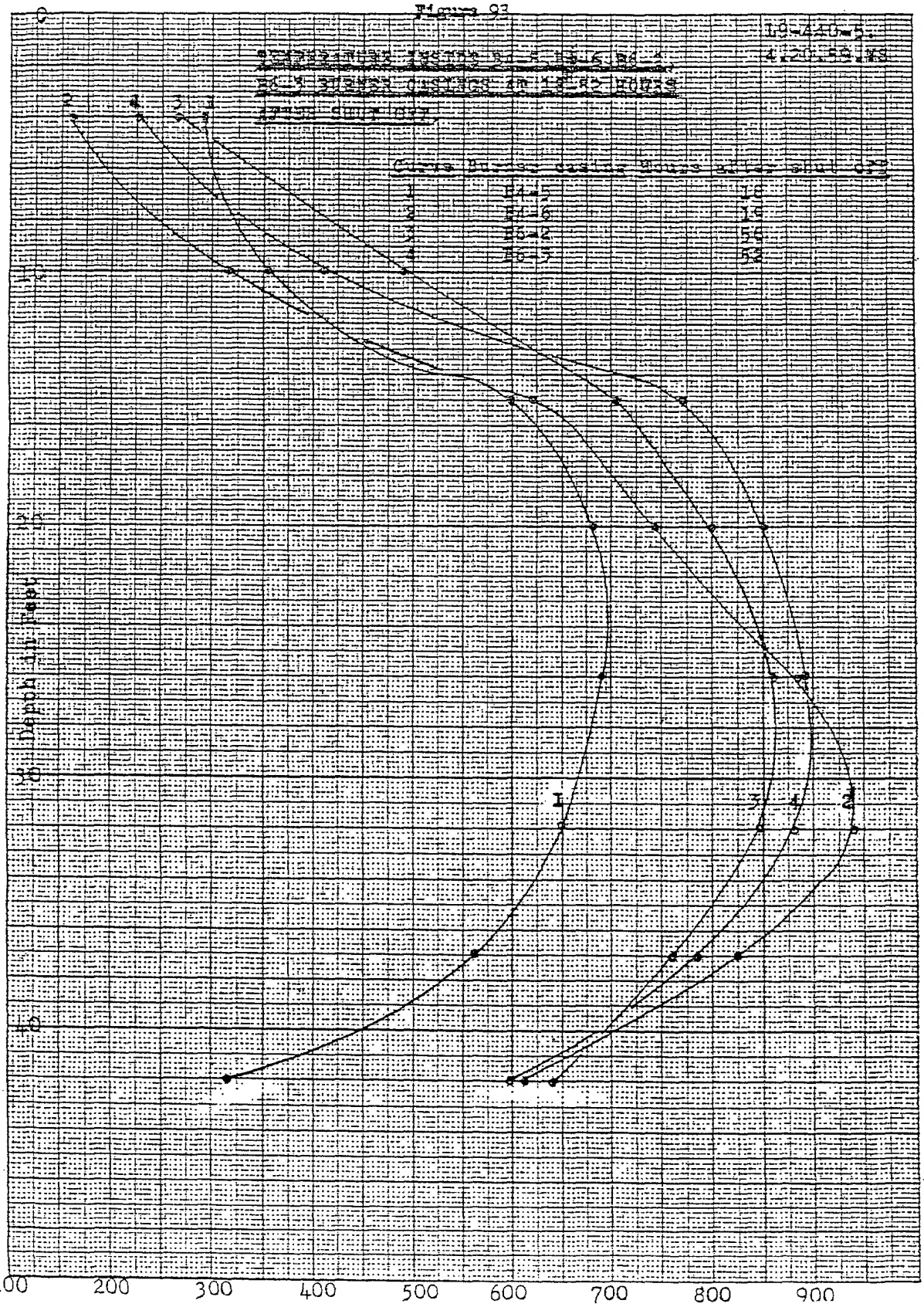


Figure 93
Depth in Feet
100
200
300
400
500
600
700
800
900

Figure 24

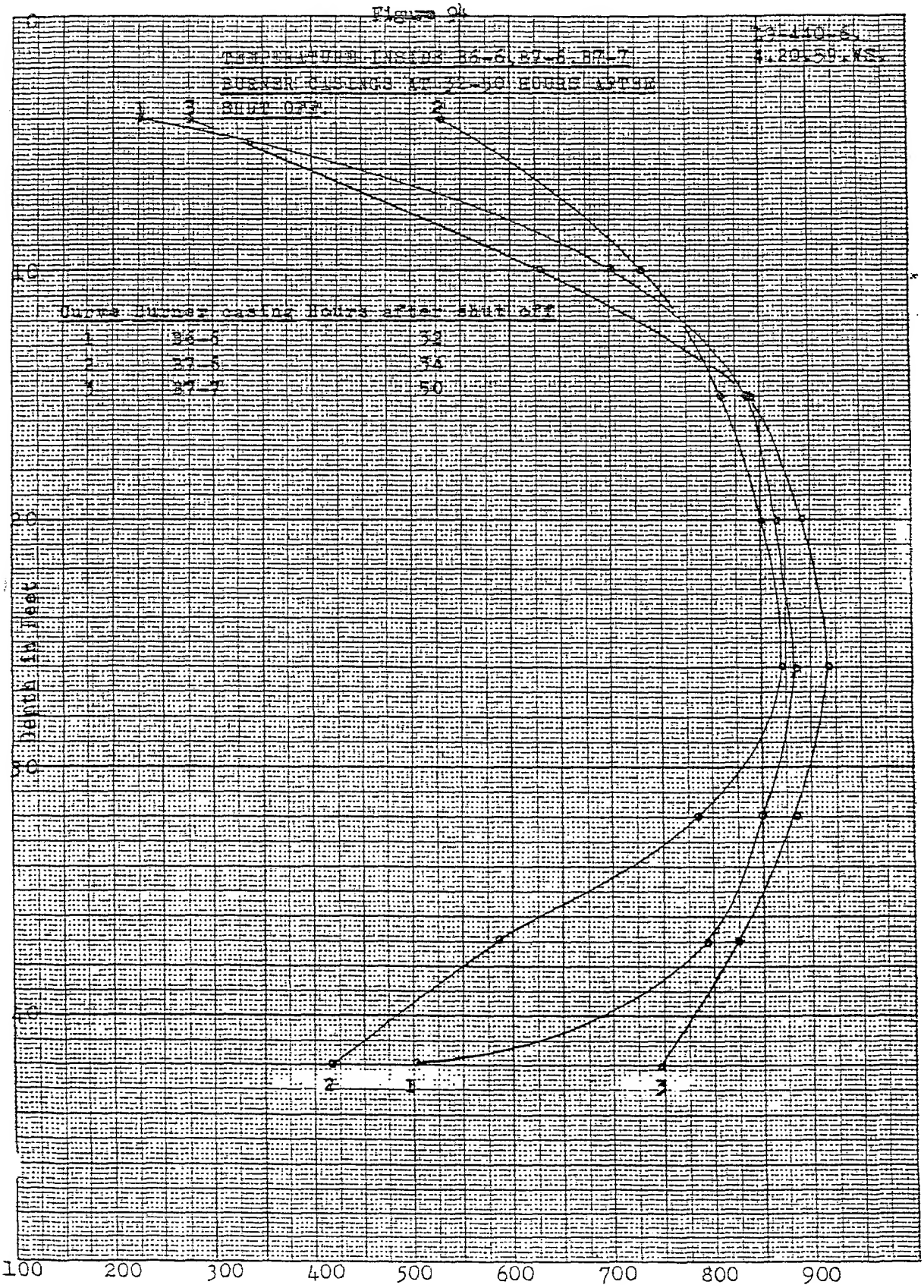
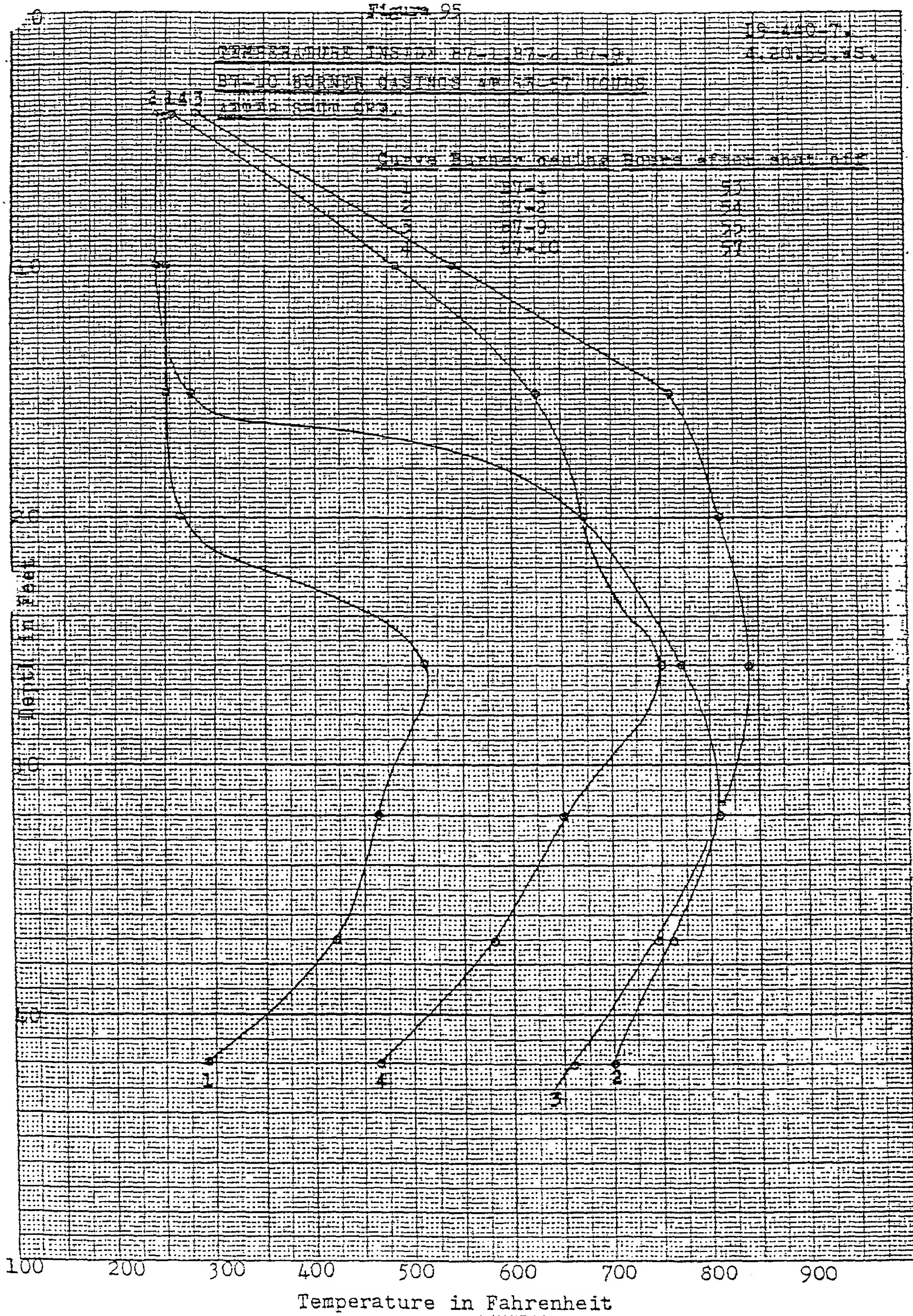

TEMPERATURE INSIDE B6-6, B7-6, B7-7
BURNER CASINGS AT 22-50 HOURS AFTER SHUT OFF
Curve Burner casing Hours after shut off
1 B6-6 32
2 B7-6 34
3 B7-7 50
Depth in feet
100
200
300
400
500
600
700
800
900

Figure 95


19-440-7.
Curve
1
2
3
4
B7-2
B7-9
53
54
55
57
0
10
20
30
40
Depth in Feet
100
200
300
400
500
600
700
800
900
Temperature in Fahrenheit

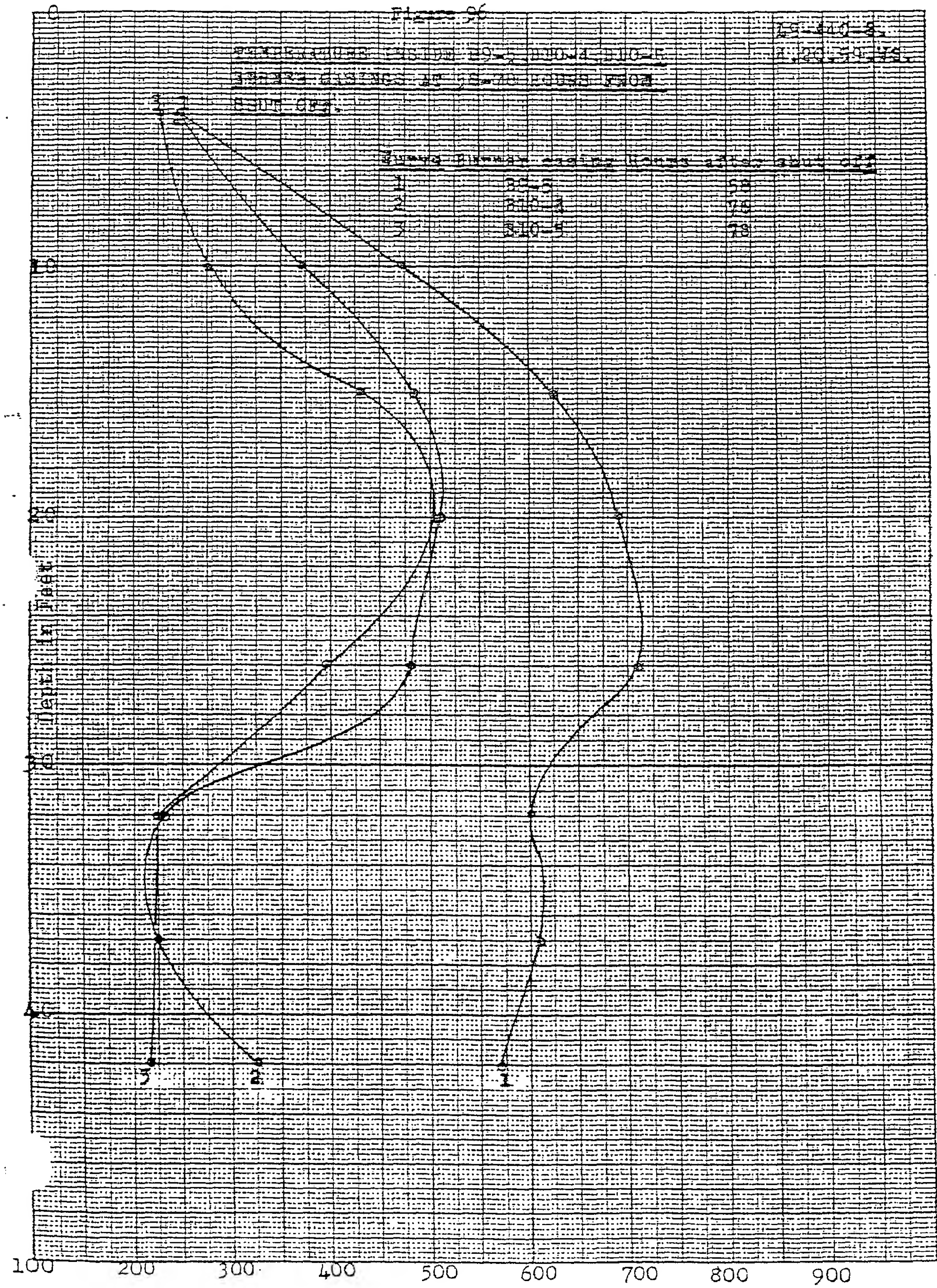


Figure 96
1
2
3
78
Depth in feet
0
10
20
30
40
100
200
300
400
500
600
700
800
900

Figure 97

L9 HEAT BALANCE

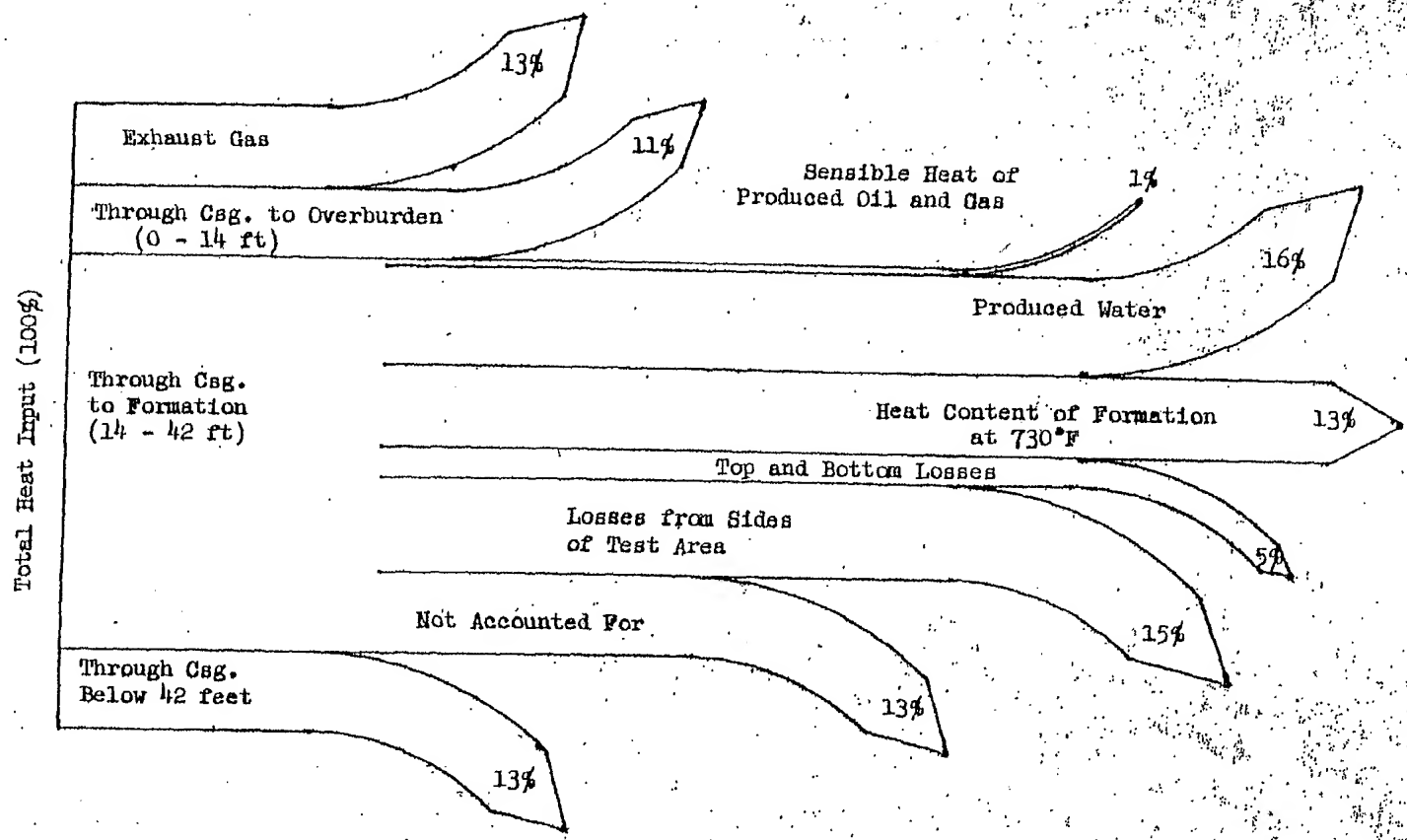
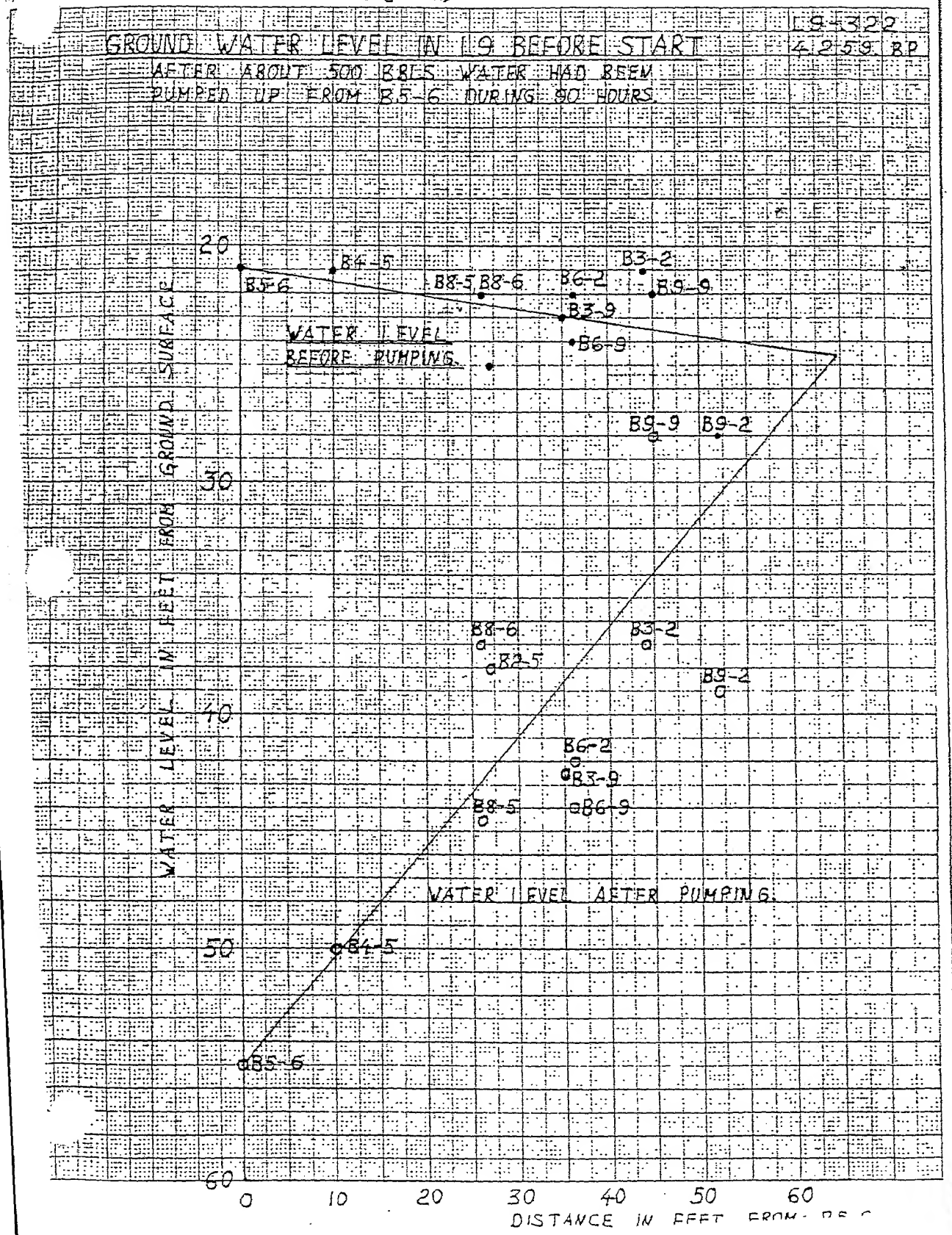


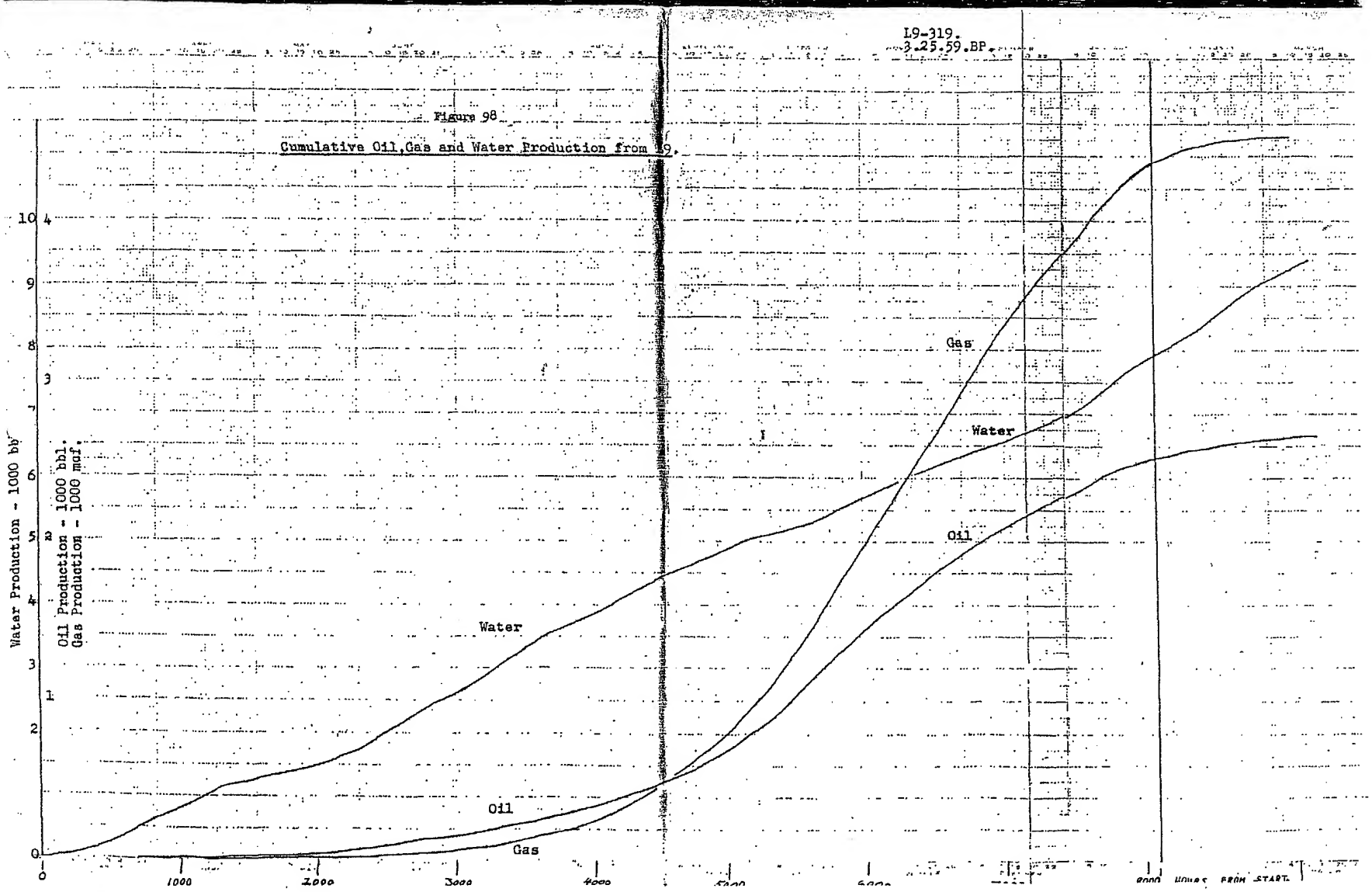
Figure 156

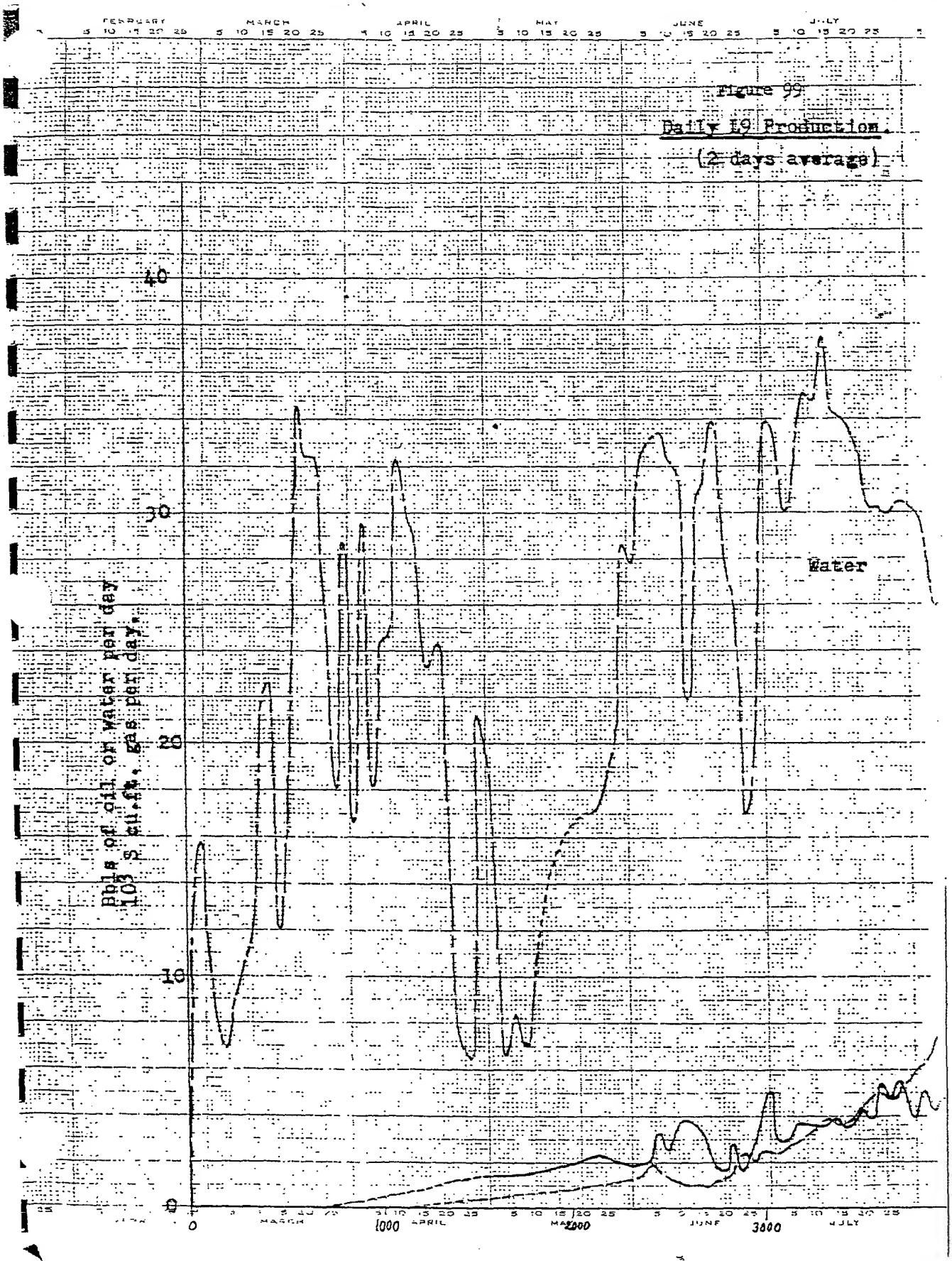

GROUND WATER LEVEL IN 19 BEFORE START
AFTER ABOUT 500 B8-5 WATER HAD BEEN PUMPED UP FROM B5-6 DURING 90 HOURS
9-322
4-2-59 BP
WATER LEVEL IN FEET FROM GROUND SURFACE
20
30
40
50
60
B5-6
B4-5
B8-5
B8-6
B6-2
B3-2
B9-9
B3-9
B6-9
WATER LEVEL BEFORE PUMPING
B9-9
B9-2
B8-6
B3-2
B2-5
B9-2
B6-2
B3-9
B8-5
B6-9
WATER LEVEL AFTER PUMPING
B4-5
B5-6
0
10
20
30
40
50
60
DISTANCE IN FEET FROM B5-6

L9-319.
3.25.59.BP.

Figure 98

Cumulative Oil, Gas and Water Production from L9.



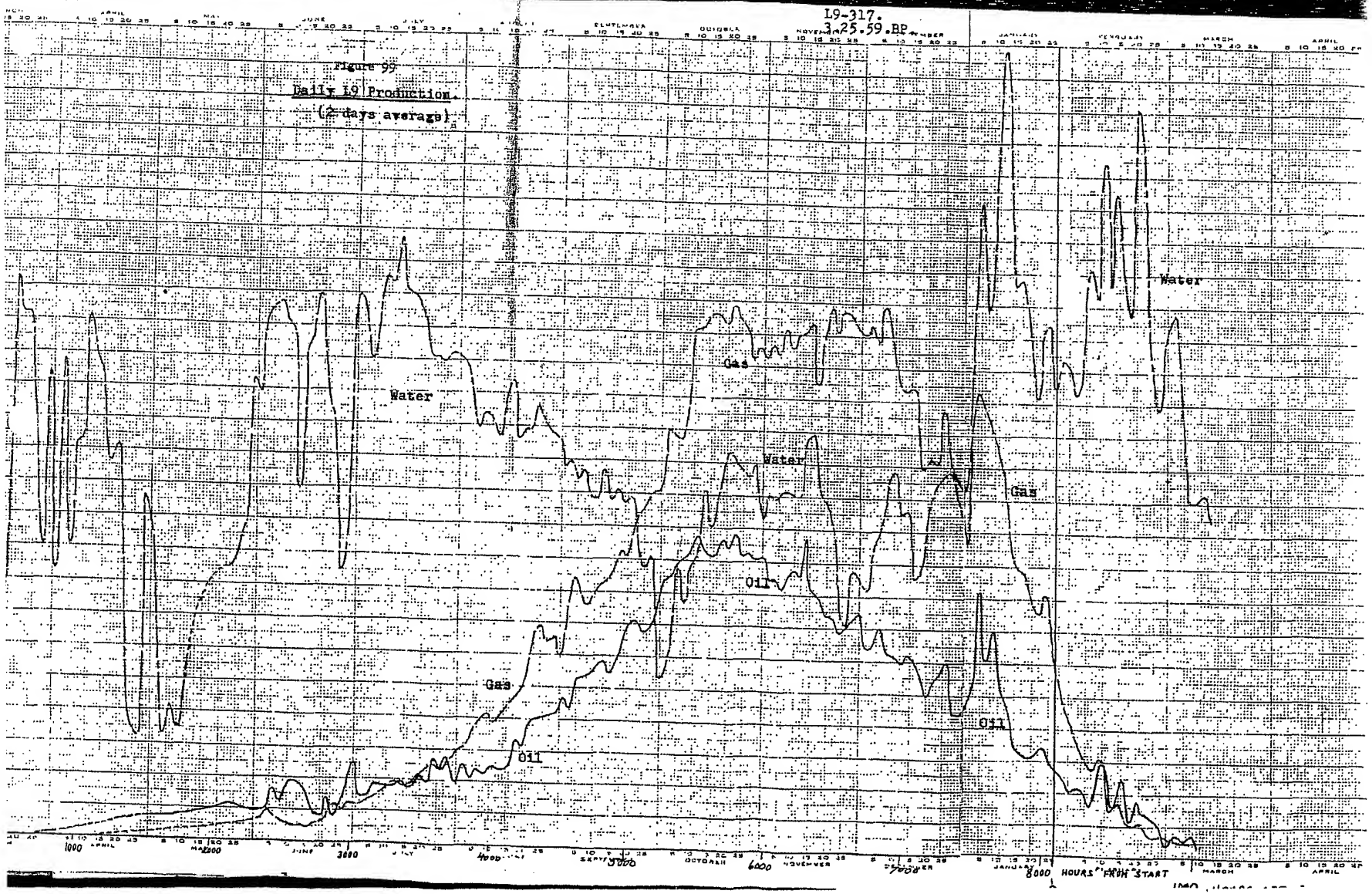

FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
Figure 99
Daily E9 Production.
(2 days average)
40
30
20
10
0
Bbls of oil or water per day
10³ S cu.ft. gas per day.
Water
0
1000
2000
3000

I9-317.
3.25.59.BP

Figure 99

Daily I9 Production.

(2 days average)



L9-705
5-16-59 RH

Figure 100

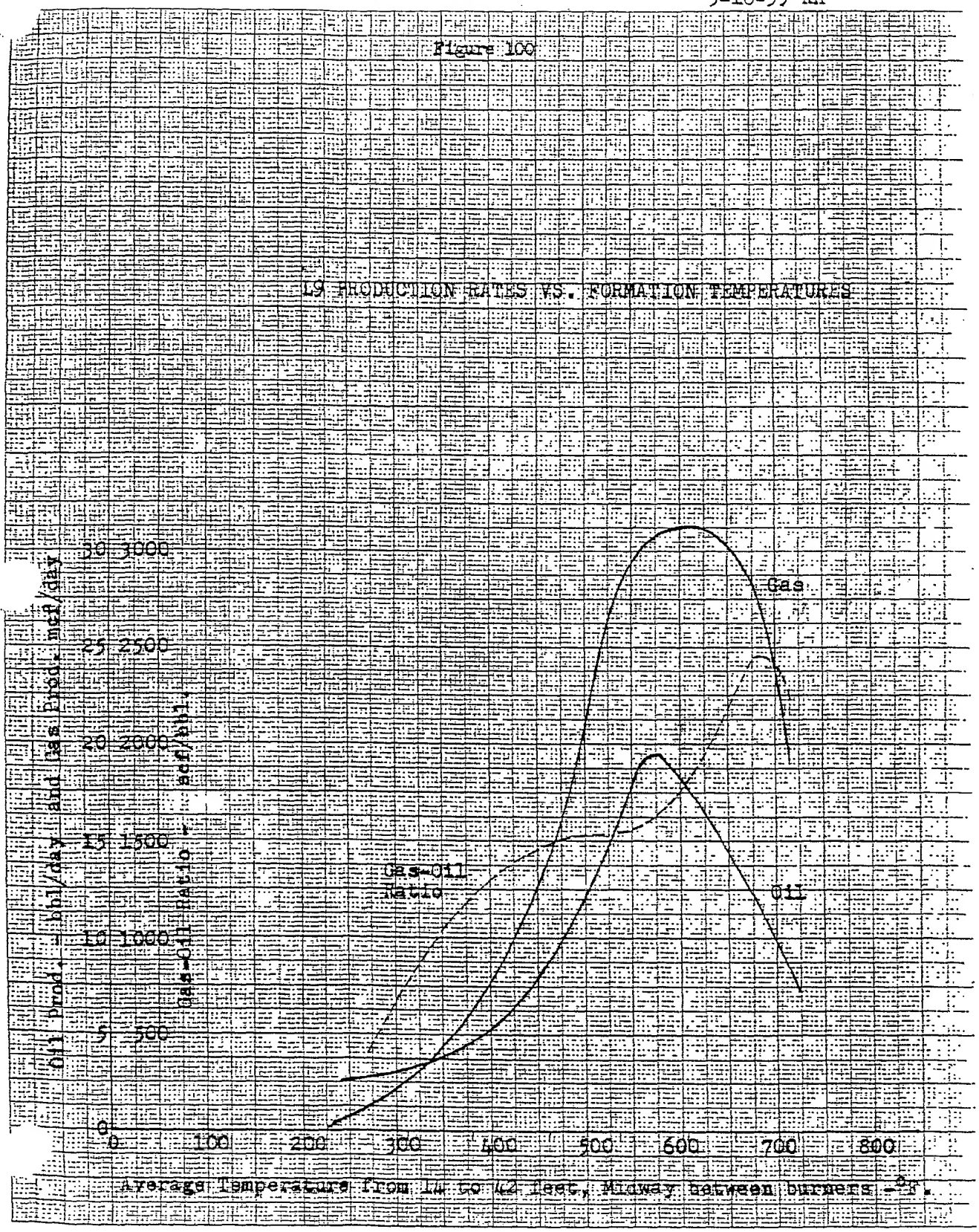


Figure 101

Gas/Oil and Water/Oil Ratios of L9 Production.

(Weekly average)

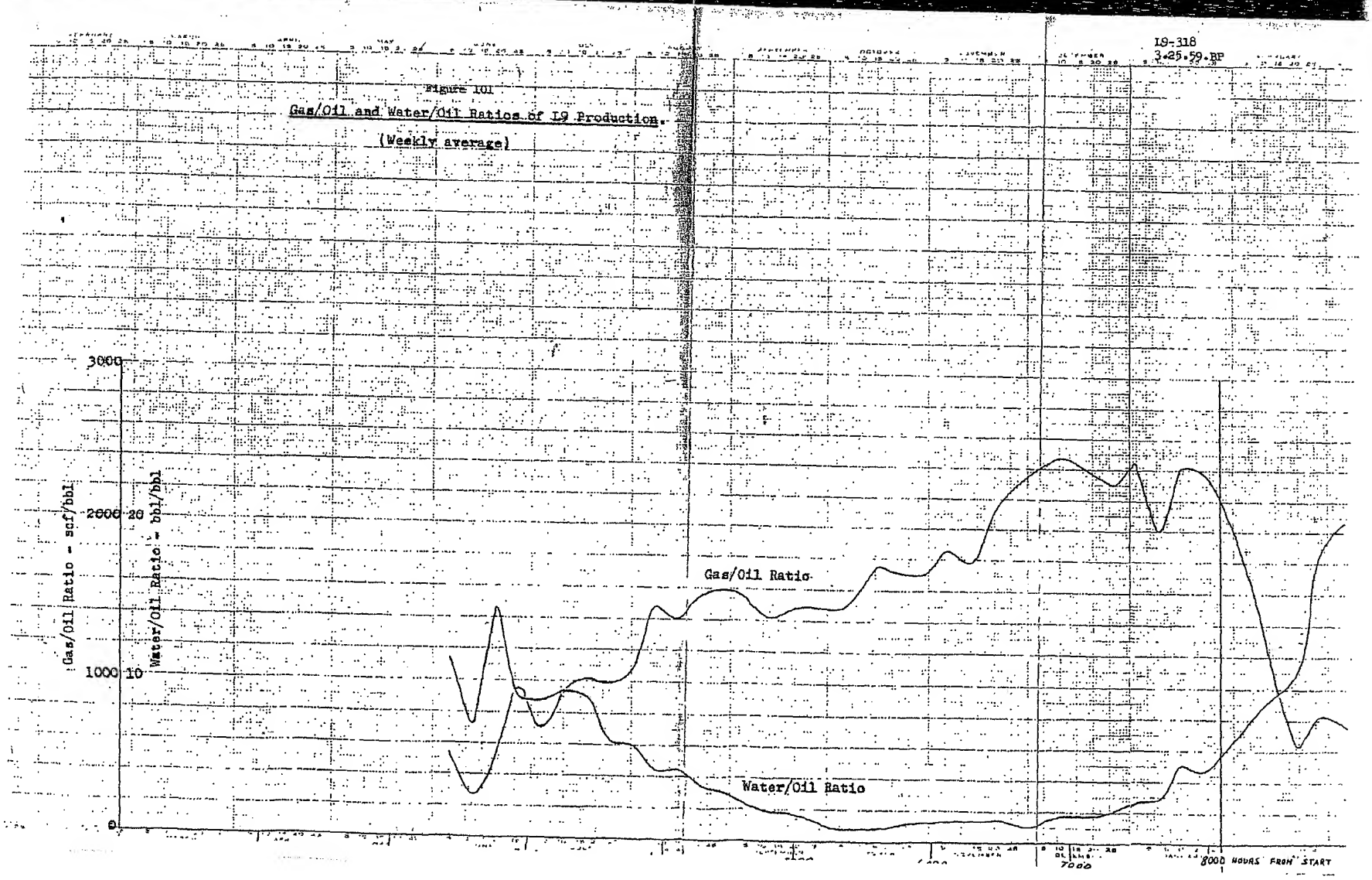
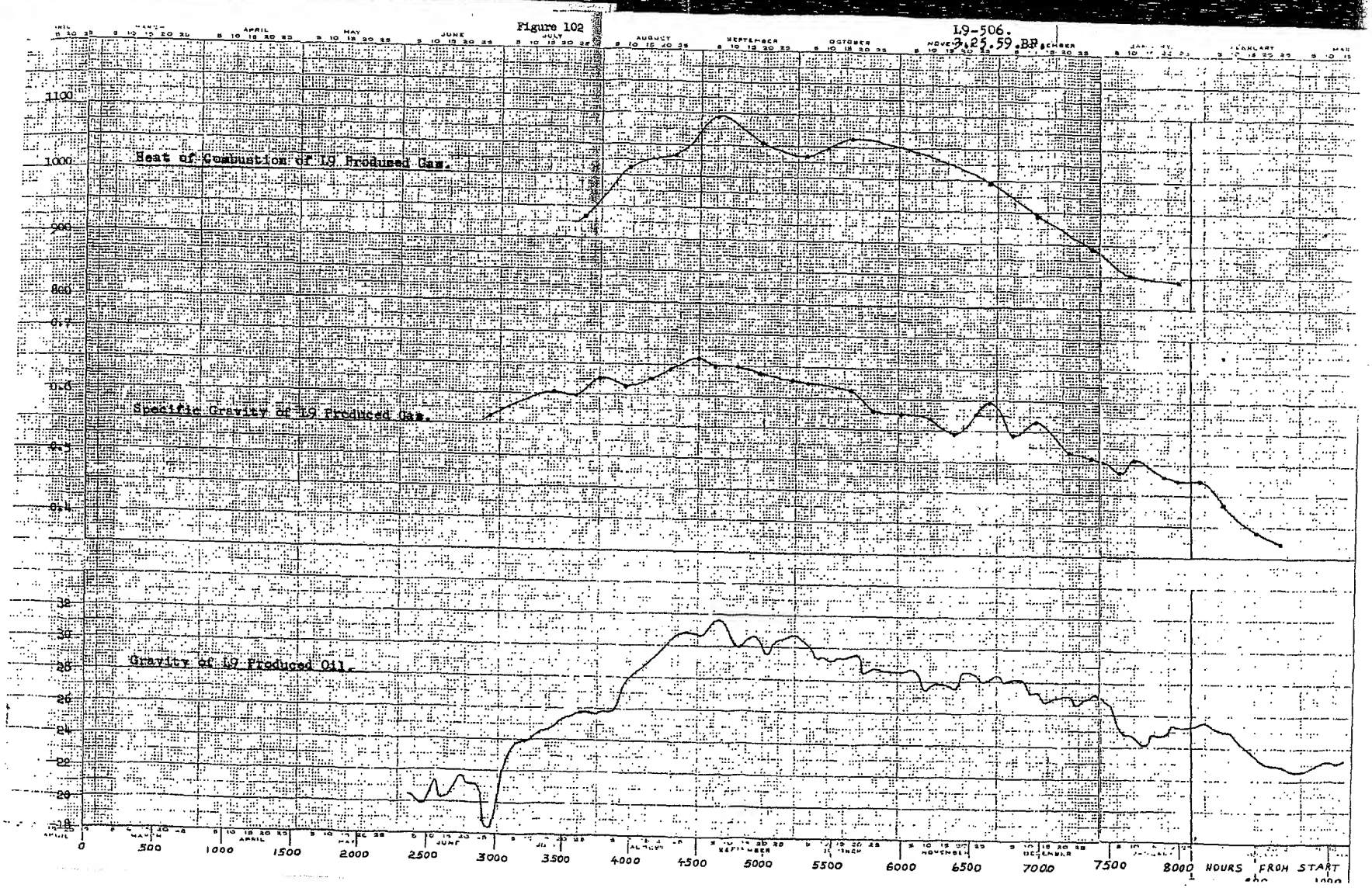


Figure 102

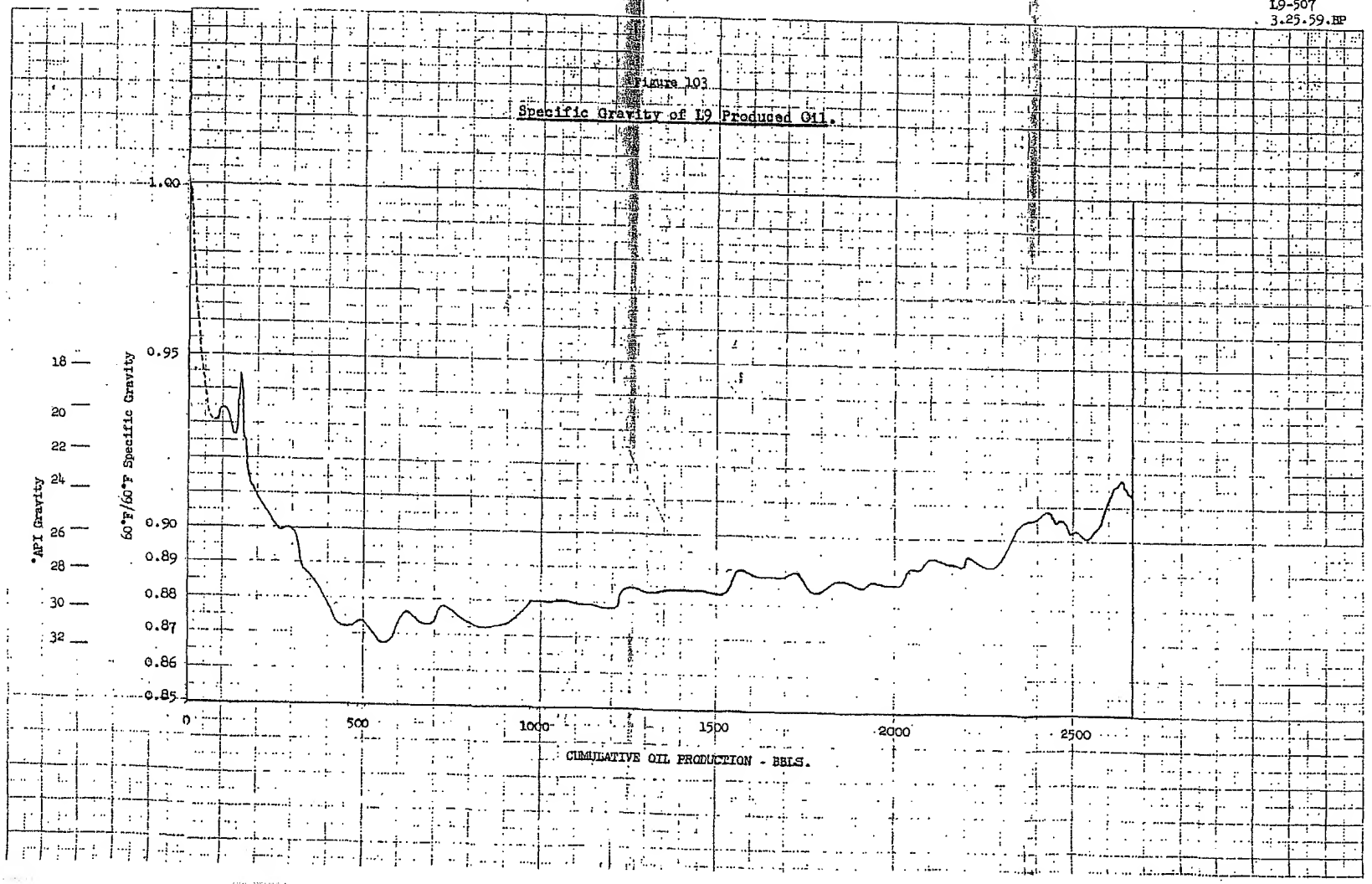
L9-506.
3.25.59.BF



L9-507
3.25.59.HP

Figure 103

Specific Gravity of L9 Produced Oil.



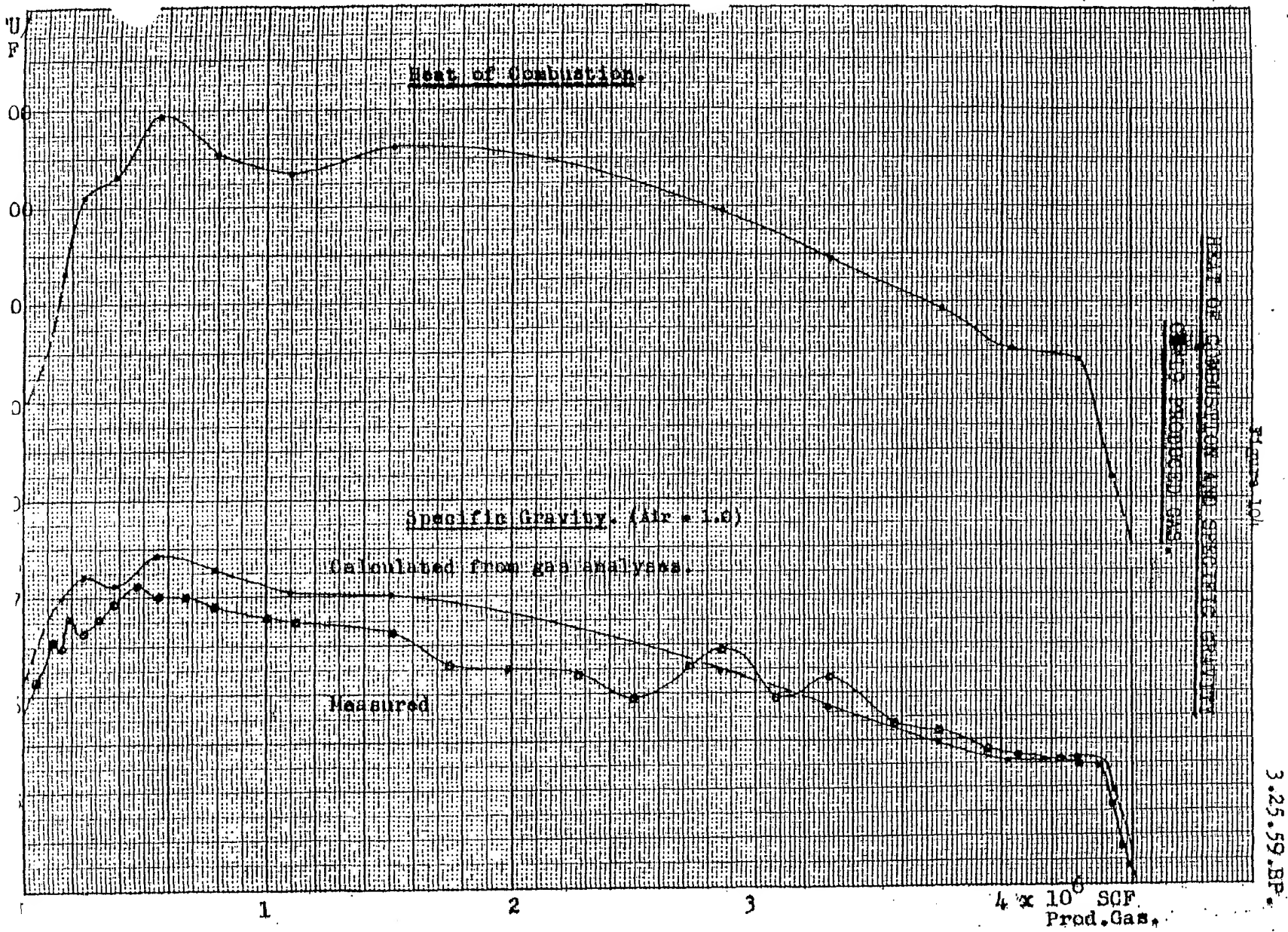
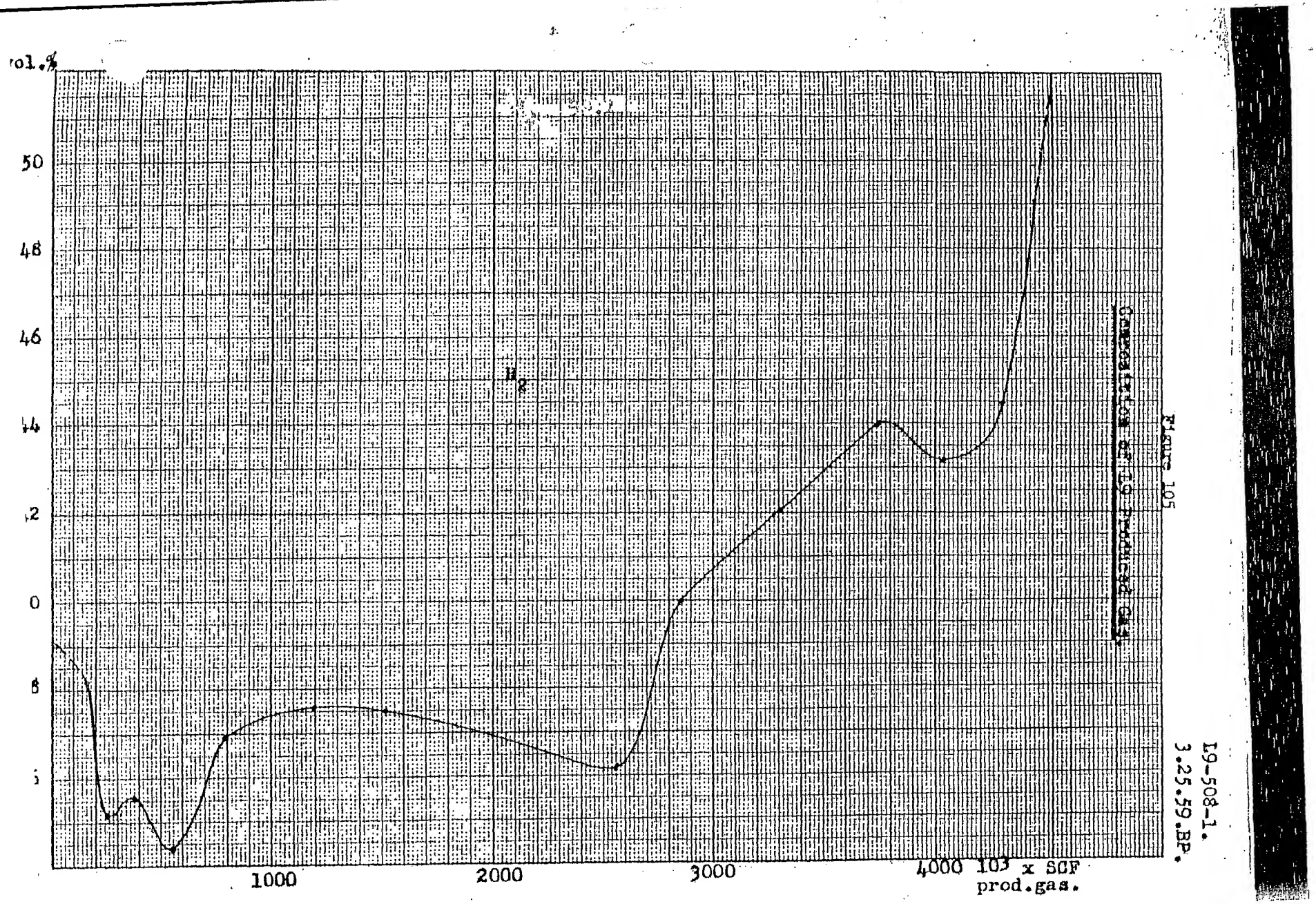


Figure No.

Heat of Combustion and Specific Gravity of Casing Produced Gas.

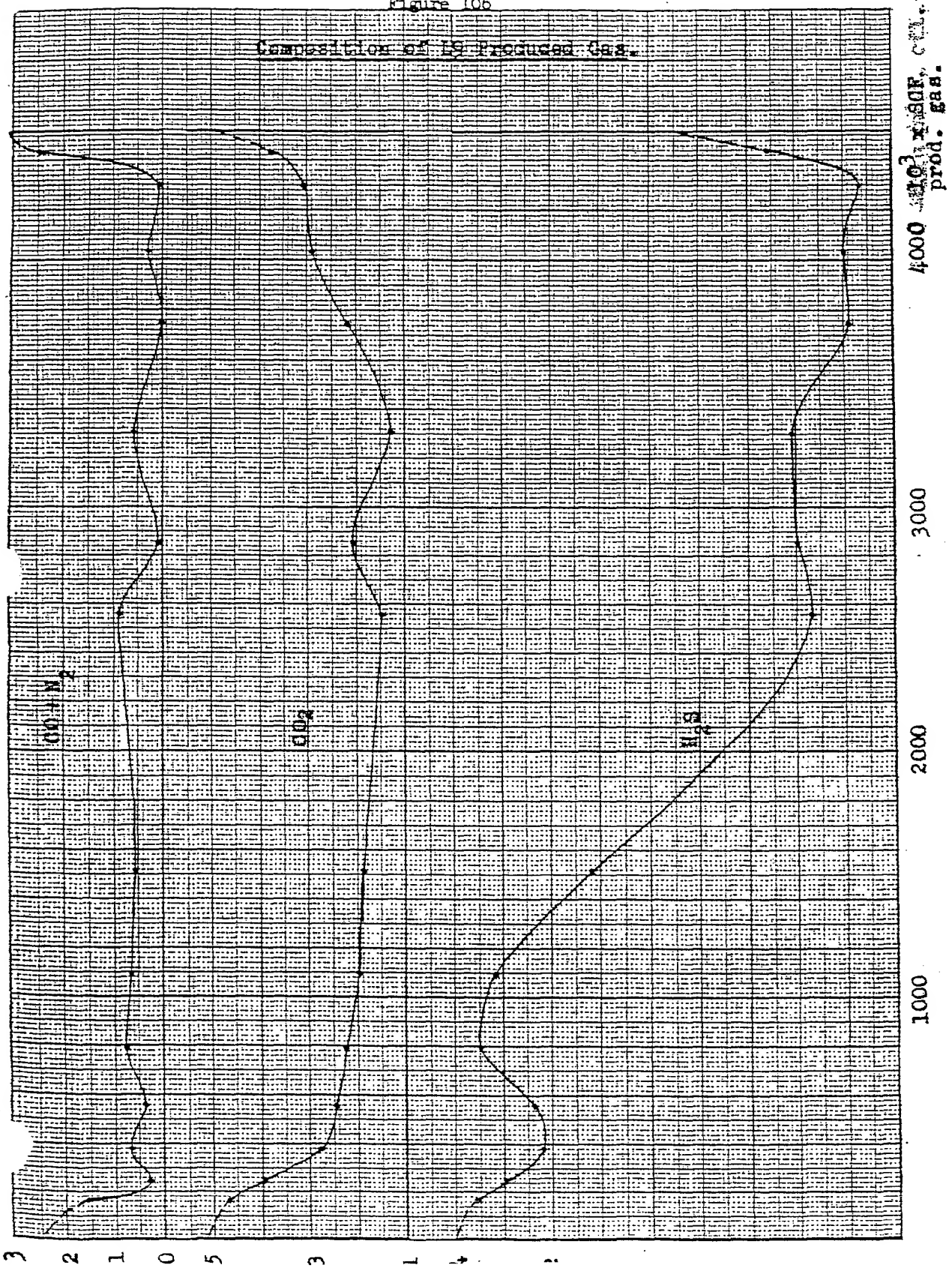
19-509.
3.25.59.BP.


vol.%
50
48
46
44
42
0
8
1
H2
1000
2000
3000
4000 103 x SCF
prod.gas.
Figure 105
Composition of Produced Gas.
E9-508-1.
3.25.59.BP.

L9-508-2.
3.25.59.BP.

Figure 106

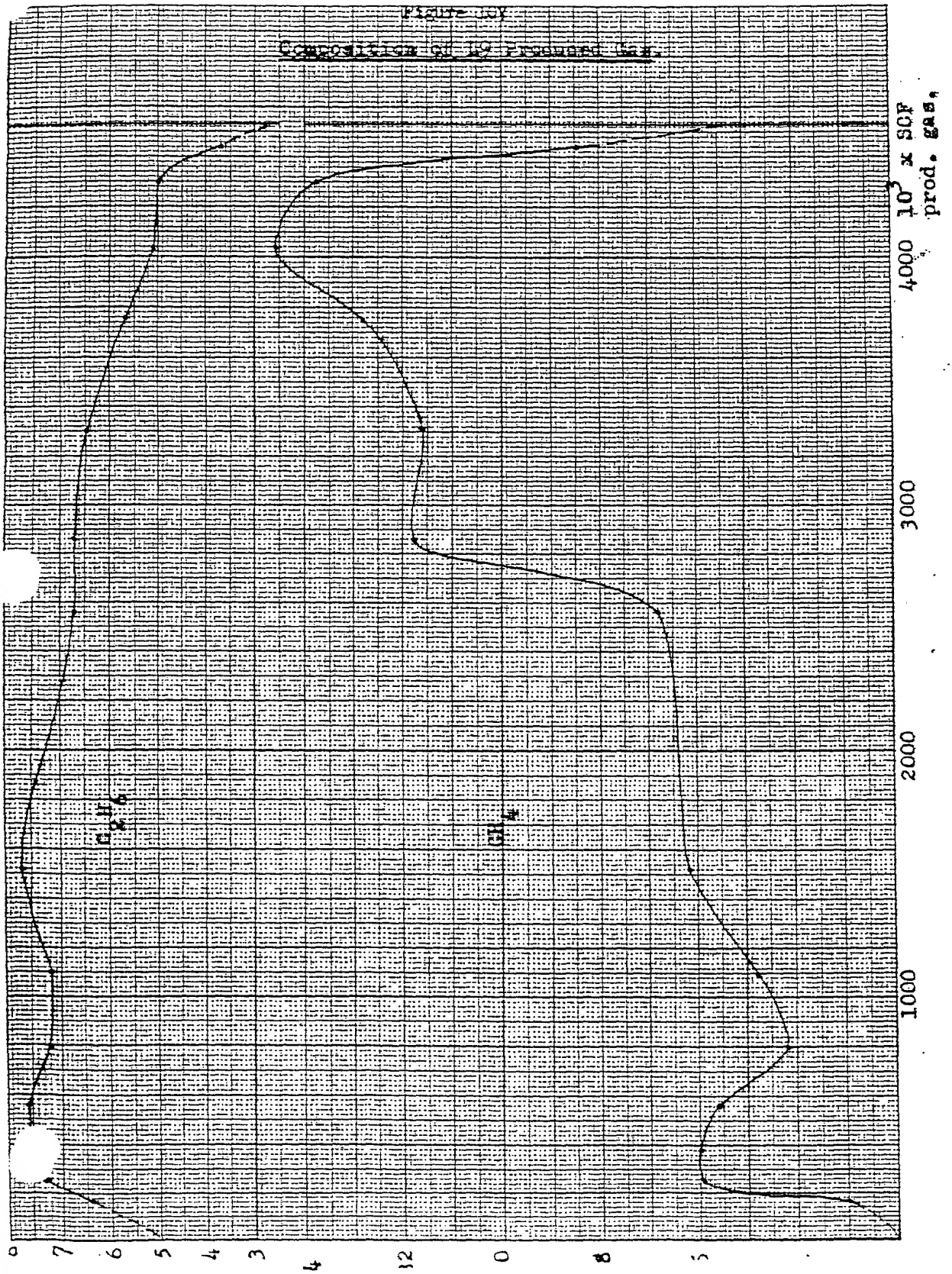
Composition of L9 Produced Gas.



L9-508-3.
3.25.59.BP.

Figure 10X

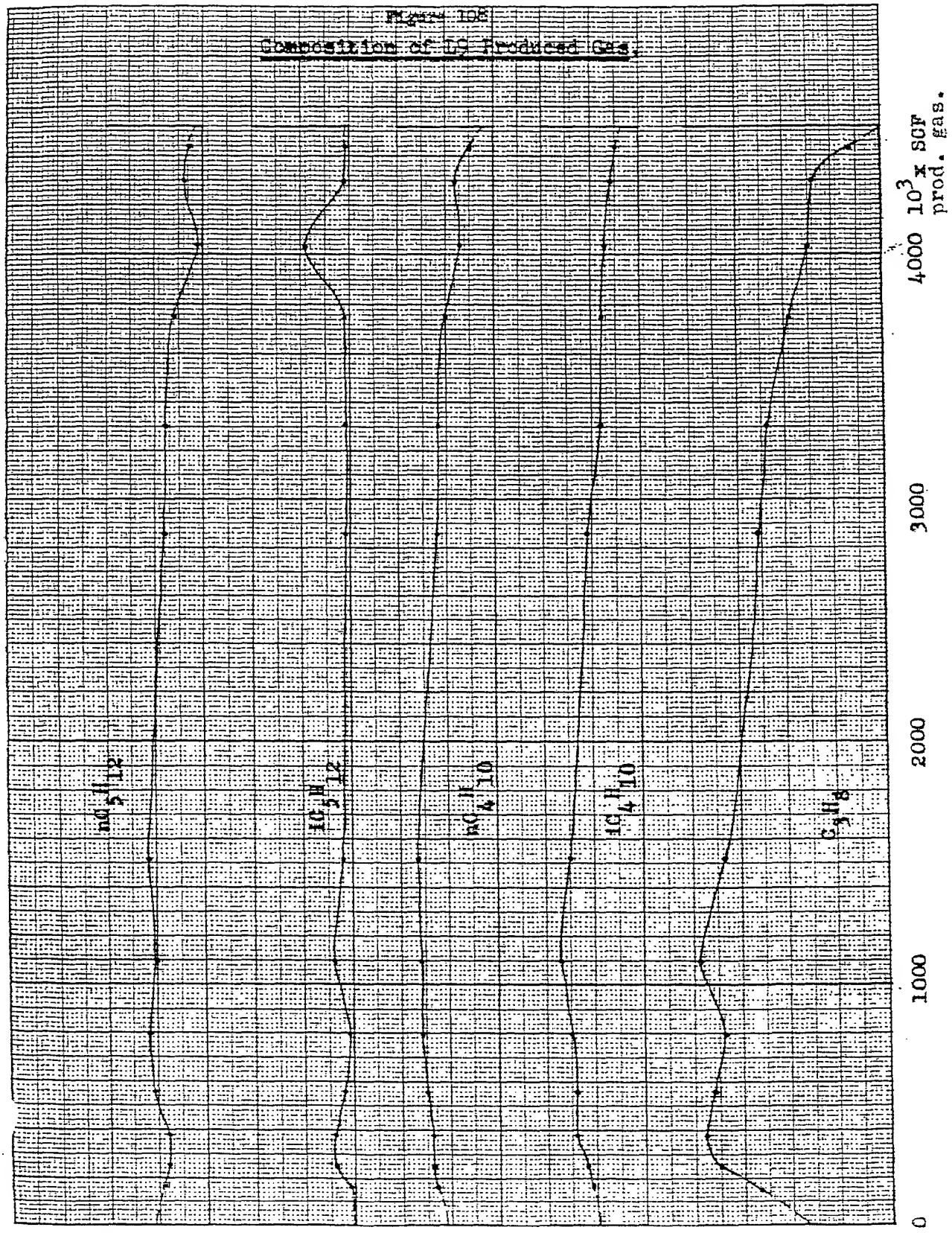
Composition of L9 Produced Gas.



L9-508-4.
3.25.59.BP.

Figure 108

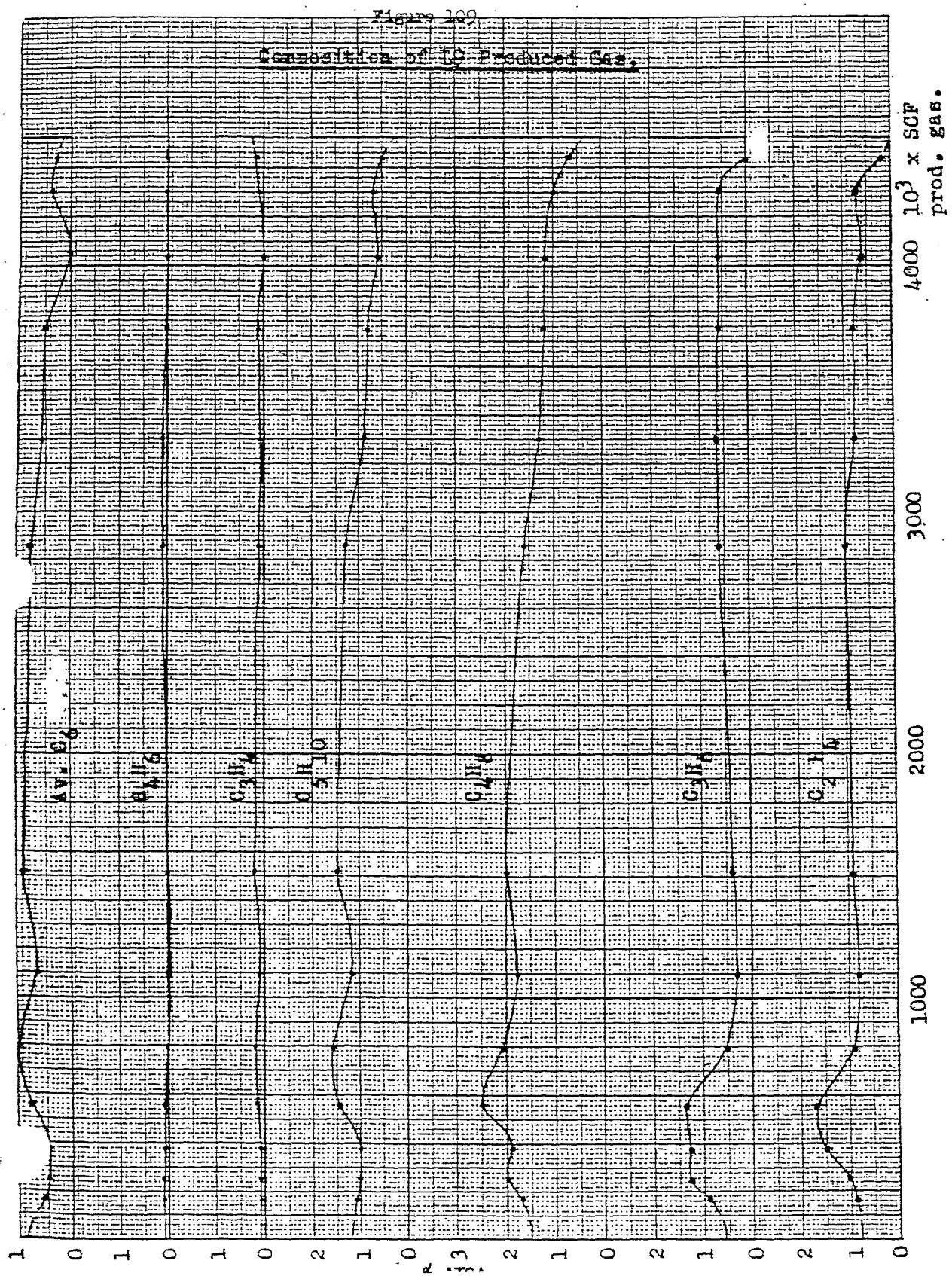
Composition of L9 Produced Gas.



L9-508-5.
3.25.59.BP.

Figure 109

Composition of LC Produced Gas.



HOLE PATTERN OF TEST L9.

L9-101.
JAN. 21. 1958. BP
REVISED 3.15.58. AP

- ○ BURNER. 15' 5⅝" AND 40' 4¾" HOLE. 52' 2½" CASING.
- ◎ CONCENTRIC GASWELL AROUND BURNER. 13' 4.50"×4.22" CASING.
- ● SEPARATE GASWELL IN BURNERHOLE. 15' 1½" CASING.
- ⊖ " " 2' FROM ADJACENT BURNER. 20' 3¾" HOLE. 15' 1½" CASING.
- ⊖ " " 5'9" " " " " " " " " "
- ⊖ " " 2' " " " " 50' 3¾" HOLE FILLED WITH GRAVEL TO 15'. 15' 1½" CASING.
- ⊖ " " 5'9" " " " " " " " " "
- ◎ CONCENTRIC GASWELL AROUND WATER WELL. 13' 4.50"×4.22" CASING.
- ⊙ WATER WELL, 5'9" FROM ADJ. BURNER. 55' 5⅝" HOLE. 50' 1½" TUBING. W56: 75' 5⅝" HOLE. 40' 3½" AND 10' 4" TUBING.
- ● TEMPERATURE WELL, 5'9" FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.
- ● " " IN BURNERHOLE. 52' 1" CASING.
- ● ,3' (T49B 4') FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.

△ CORED BEFORE TEST ⊗ CORED AFTER TEST ⊖ OVERBURDEN CORES AFTER TEST

Figure 110 L9 CORE HOLE LOCATIONS L9-21B 5.26.58 BP

L9 CORE HOLE LOCATIONS
Figure 110

Core Hole No.	Locations
C1	10' N. of B7-10 then 1' west
C2	10' N. of B5-10 then 4' - 4" west
C3	7' N. of C2
C4	10' N. of B3-10 then 2'-4" east
C5	10' S. of B8-1
C6	10' S. of B6-1 then 4'-4" east
C7	5' S. of B3-1
C8	2' N. of B3-1 (between B3-1 and B3-2)
C9	2'-3-1/2" S. of B3-2 (-"-)
C10	11'-5-1/2" E. of B2-4
C11	7'-10-1/2" E. of B2-4
C12	3'-8" E. of B2-4 (between B2-4 and T24)
C13	1'-5" N. of B7-10
C14	4'-6" S. of B7-10 (between B7-10 and B7-9)
C15	1'-1-1/2" N. of B7-9 (-"-)
C16	10" N. of B6-3
C17	1'-5" from B6-3 towards B7-2
C18	2'-11" " " " "
C19	5'-9" " " " " (between B6-2, 6-3, 7-3)
C20	5' S. of B6-3 (between B6-2 and B6-3)
C21	Midway between B3-3, B4-2, and B4-3
C22	" " B4-5, B4-6, and B5-6
C23	" " B6-6, B7-6, and B7-8
C24	2'-5-1/2" west of B9-5
C25	3'-5" east of B9-5

L9 CORE HOLE LOCATIONS
Figure 110

Core Hole No.	Locations
C26	4'-5" east of B9-5
C27	5' from B4-5 between B4-5 and B5-6
C28	2'-11" from B4-5 towards B5-7
C29	1'-5" " " " "
C30	11" " " " B4-4
C31	5' from B7-6 between B7-6 and B7-7
C32	2'-11" from B7-6 towards B6-7
C33	1'-5" " " " "
C34	10" to 12" from B7-6 towards B7-5
C35	14'-7-1/2" east of B2-4

Figure 111

L9-215-1
5-19-59 RH

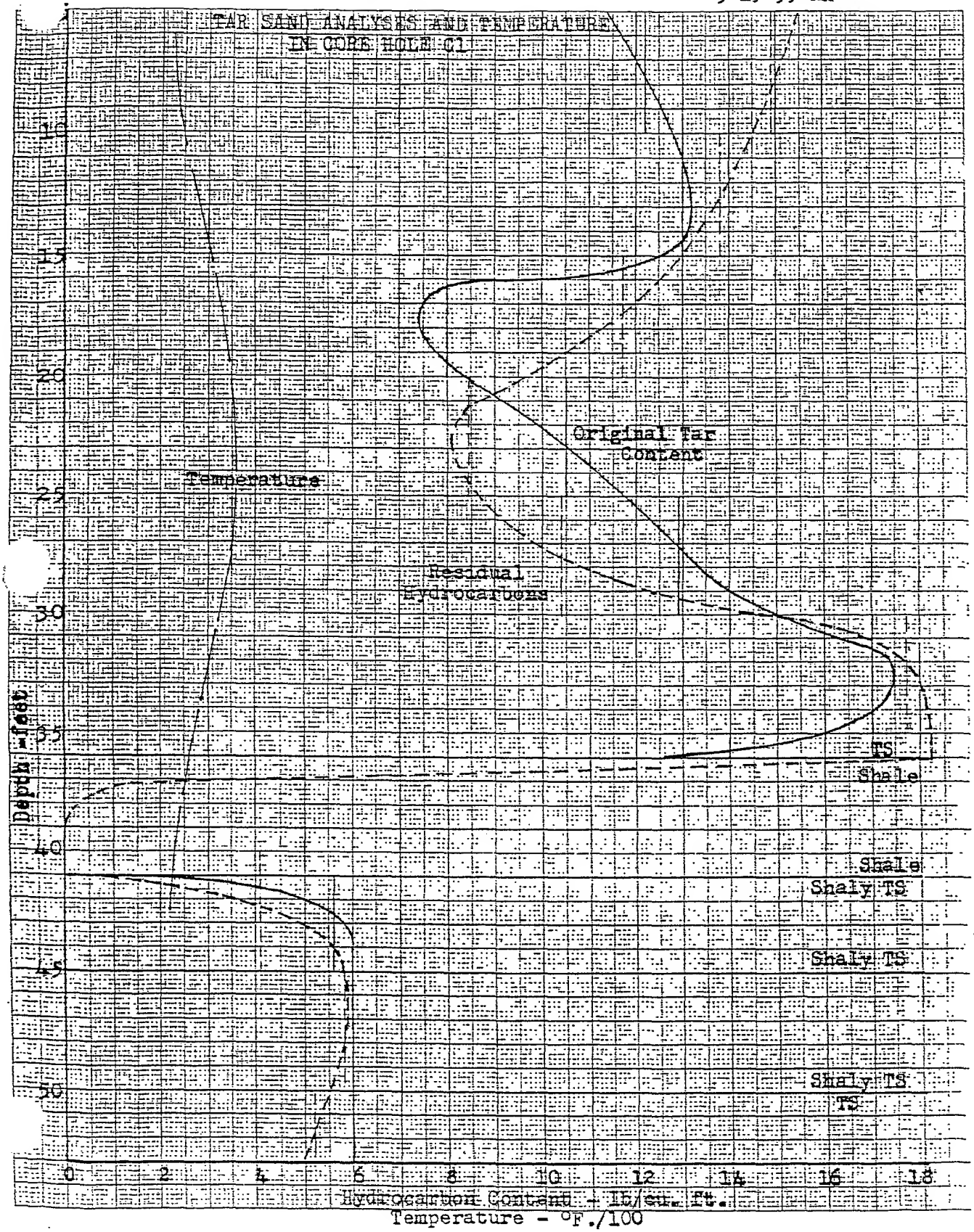


Figure 112

L9-215-2
5-21-59 RH

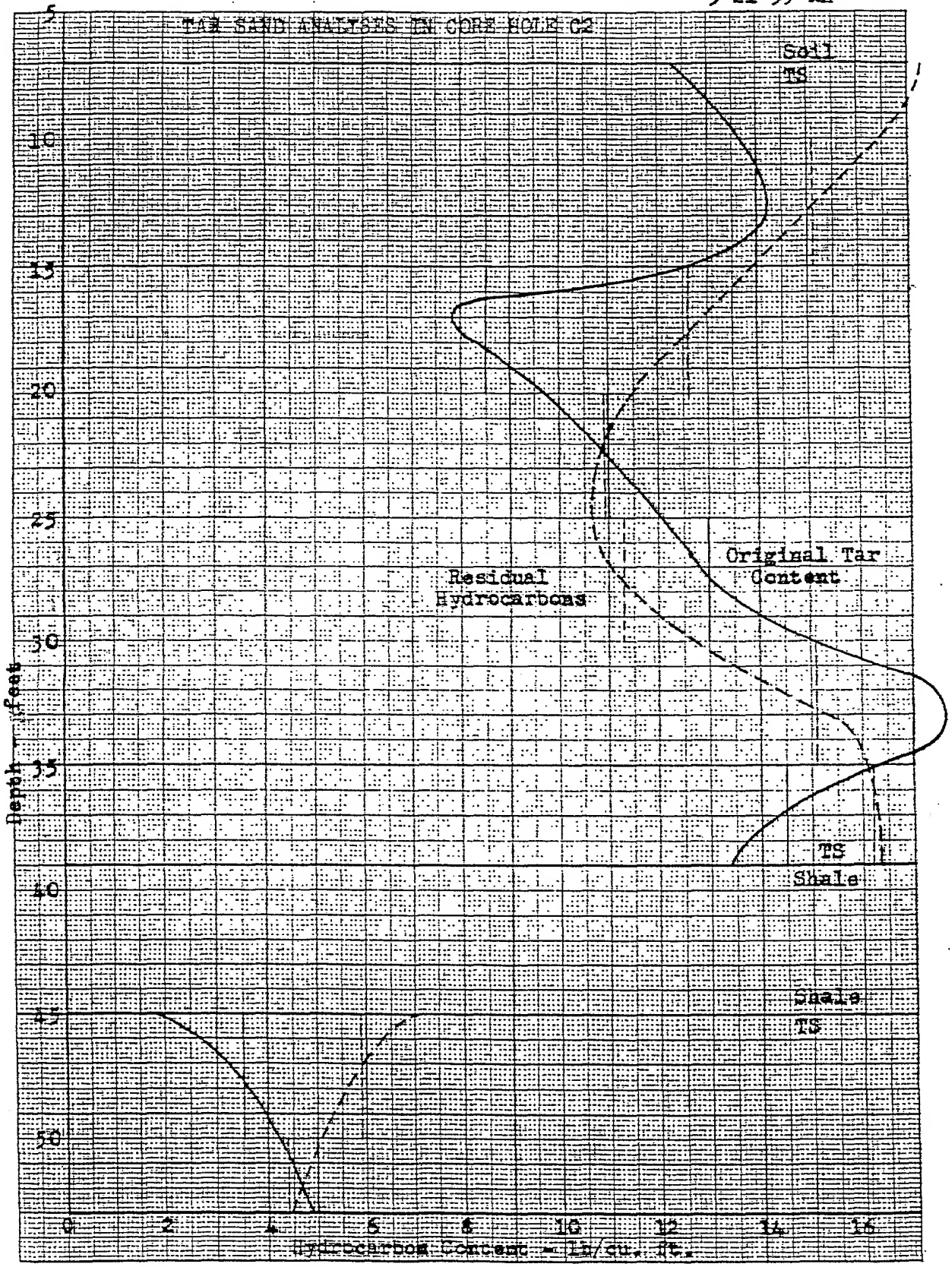


Figure 113

TAR SAND ANALYSES IN CORE HOLE C3

L9-215-3
5-21-59 RH

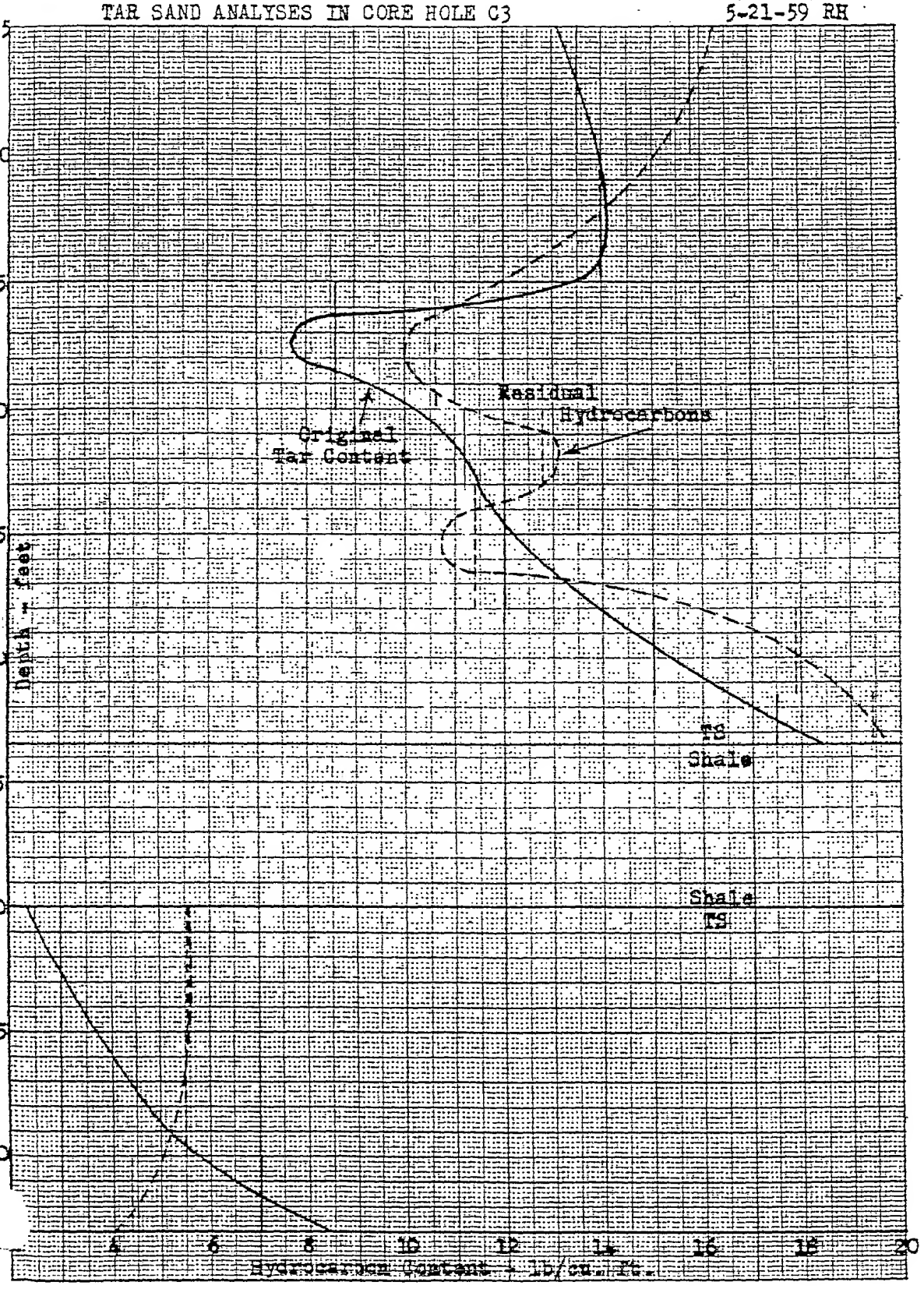
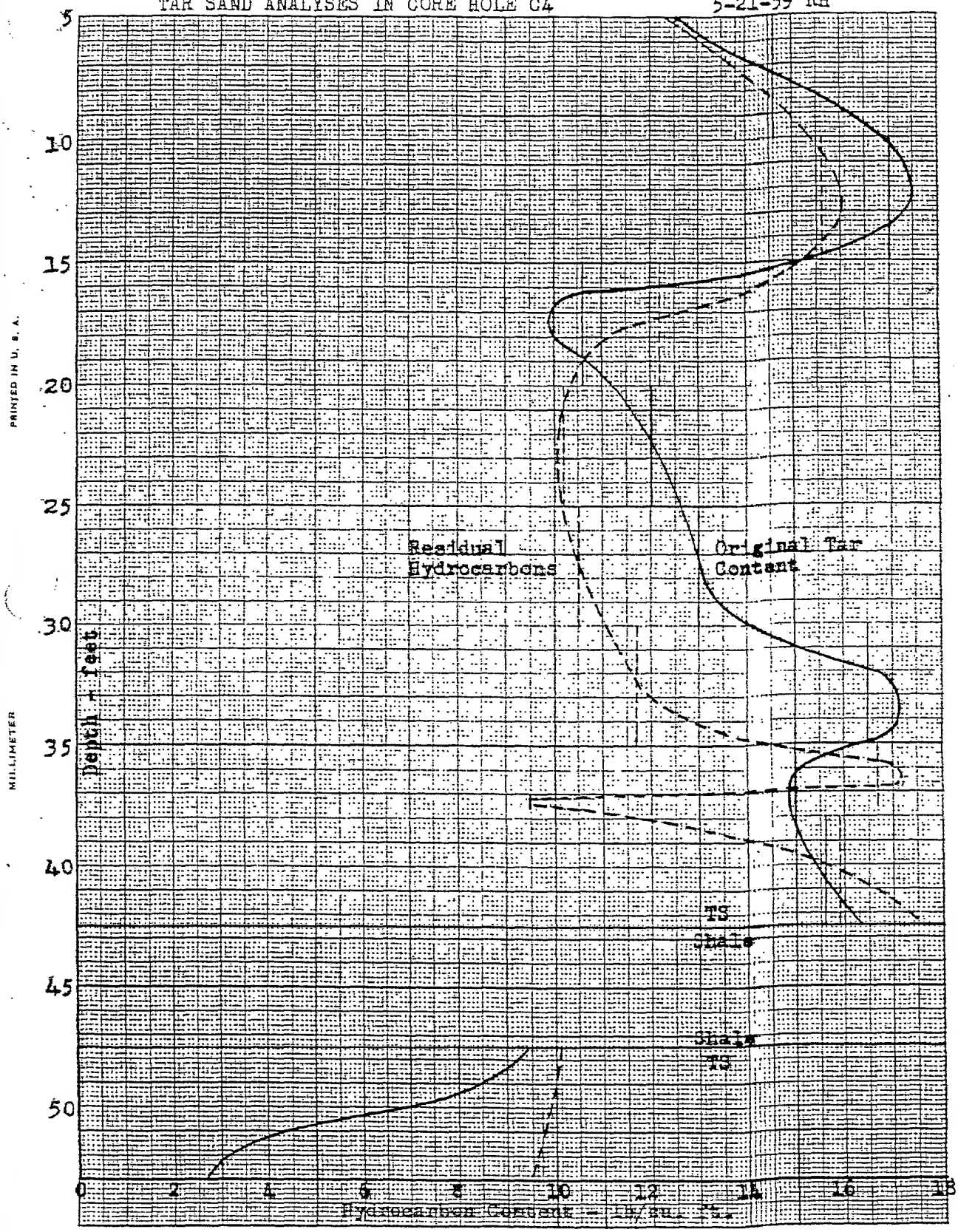


Figure 114

TAR SAND ANALYSES IN CORE HOLE C4

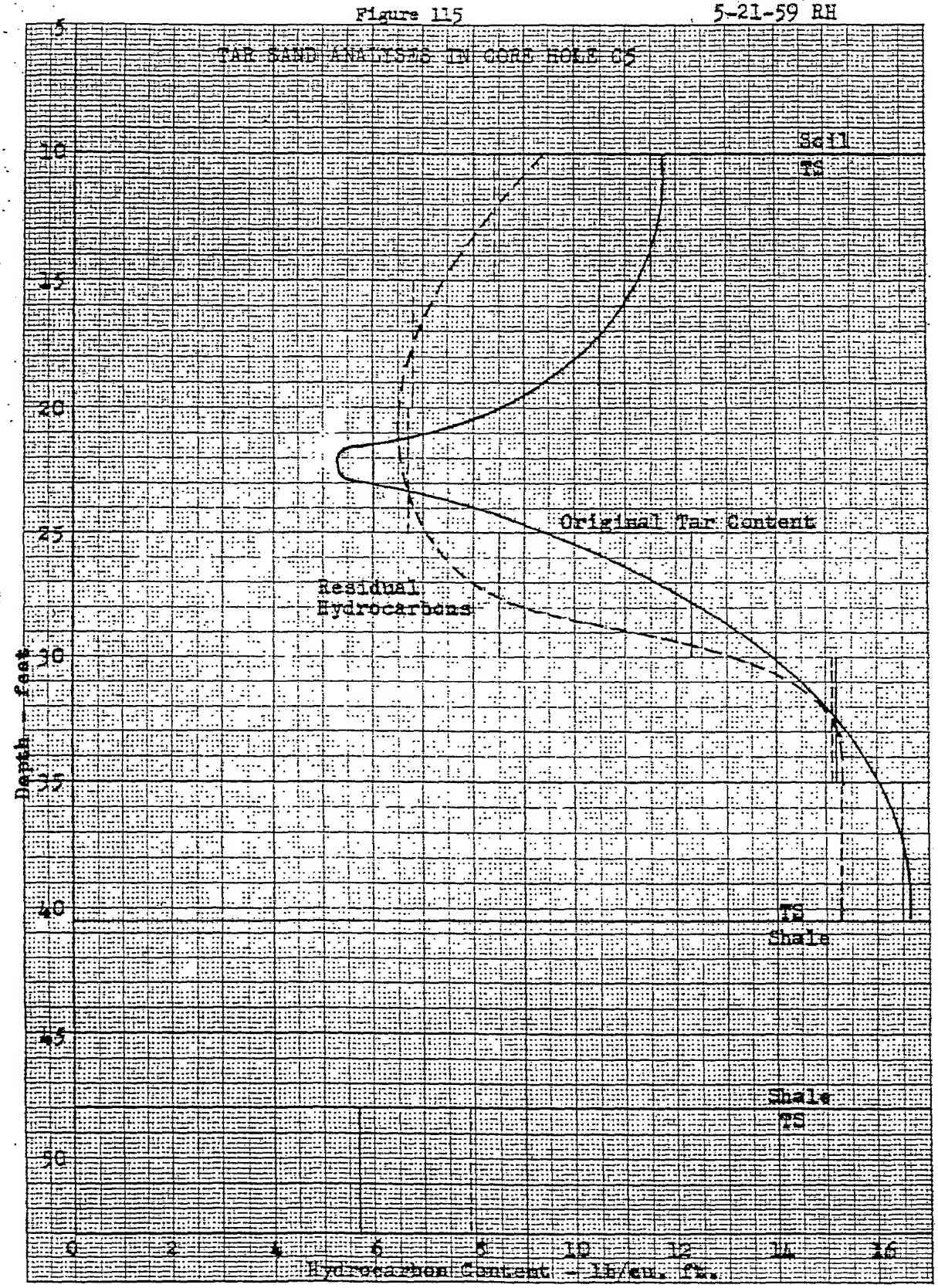
L9-215-4
5-21-59 RH



L9-215-5
5-21-59 RH

Figure 115

TAR SAND ANALYSES IN CORE HOLE C5



L9-215-6
5-21-59 RH

Figure 116

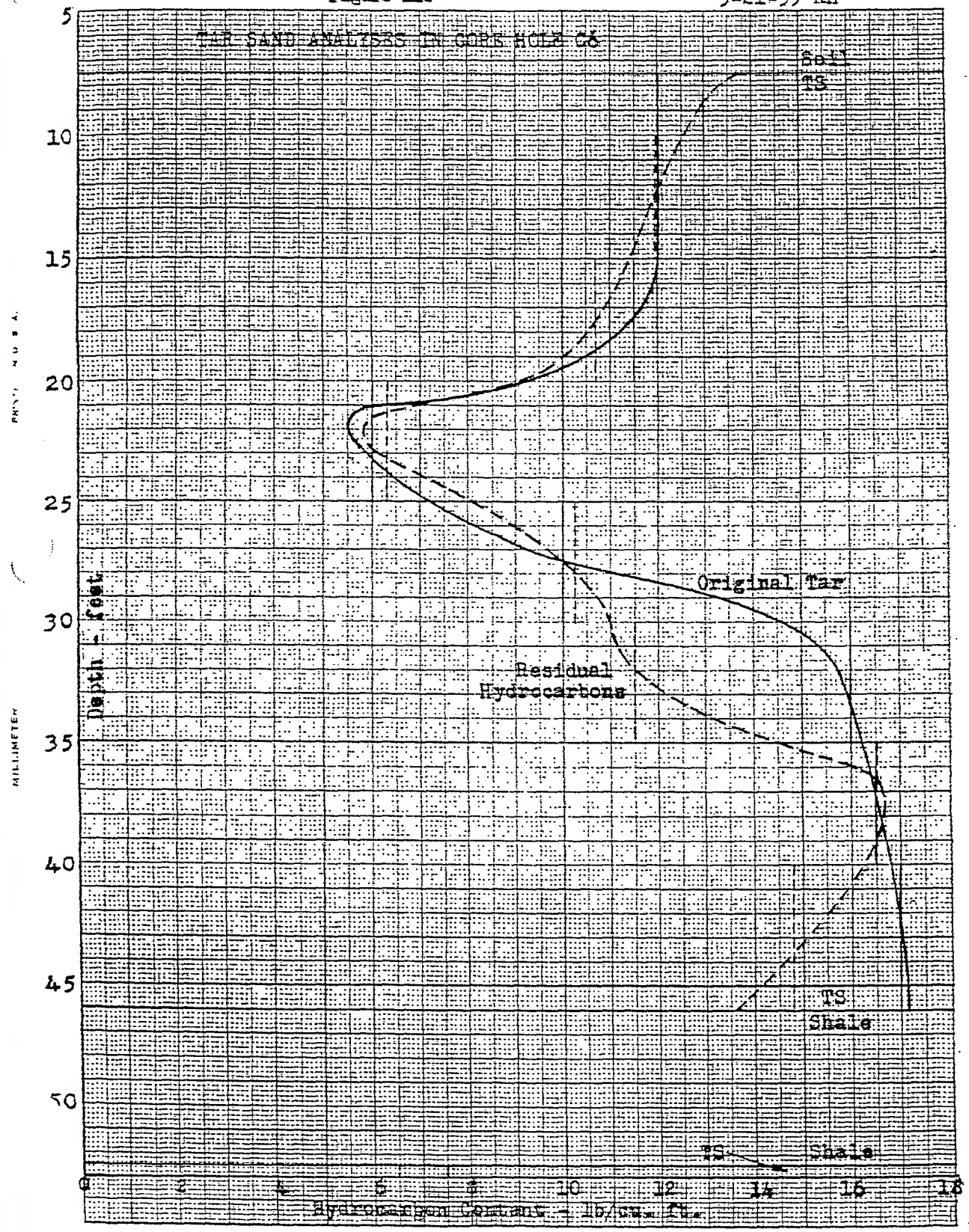


Figure 117

L9-215-7
5-21-59 RH

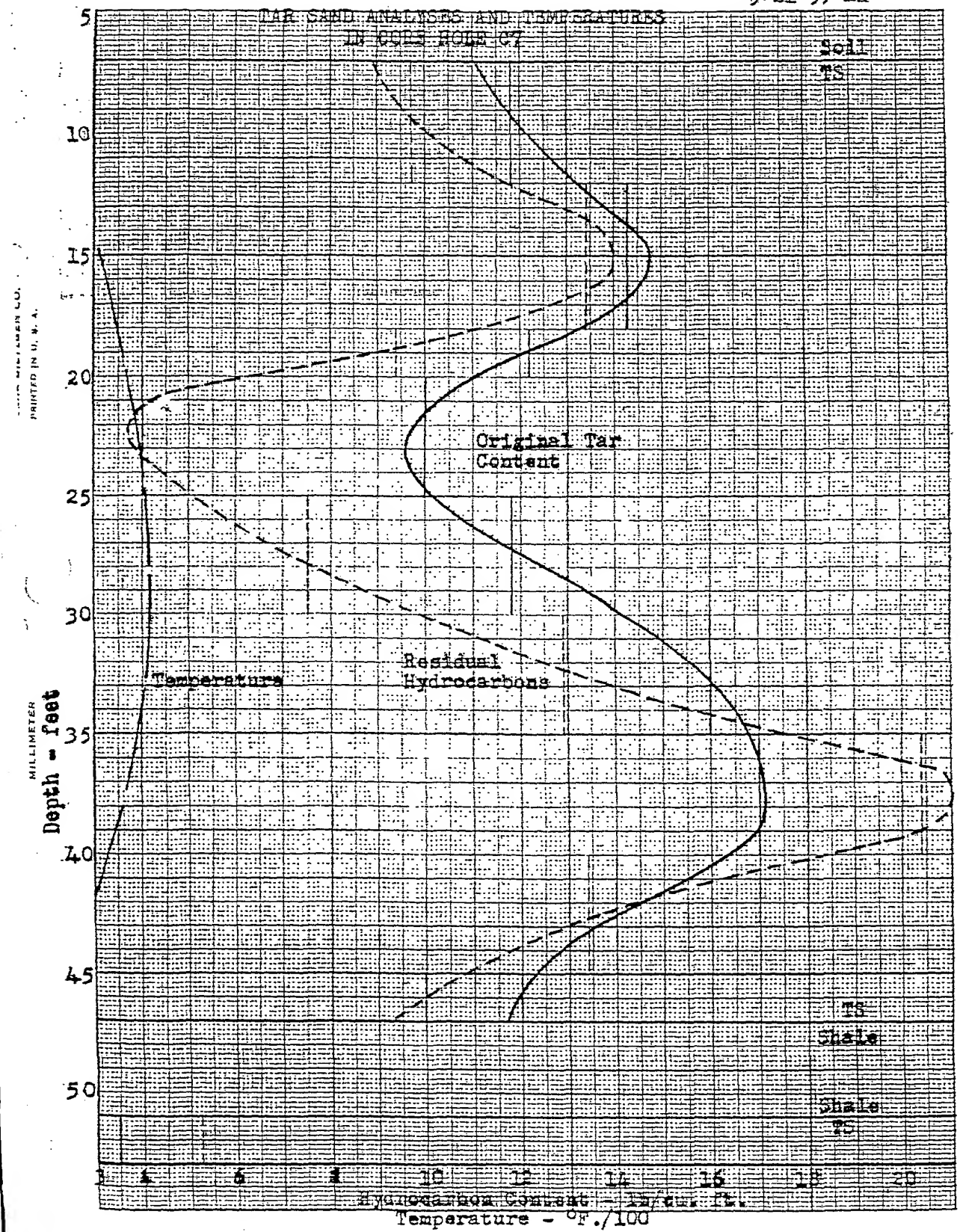


Figure 118

L9-215-8
5-21-59 RH

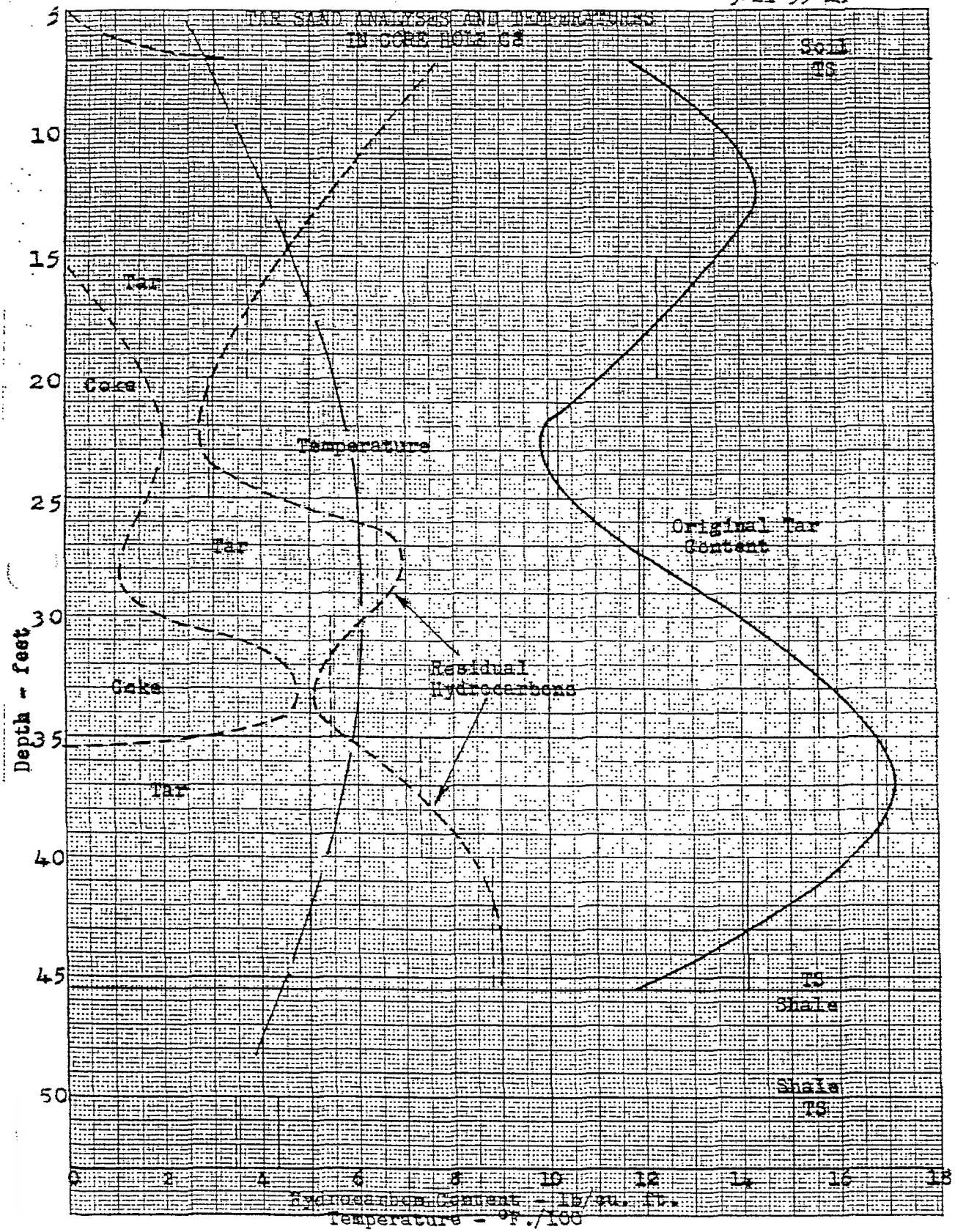


Figure 119

L9-215-9
5-25-59 RH

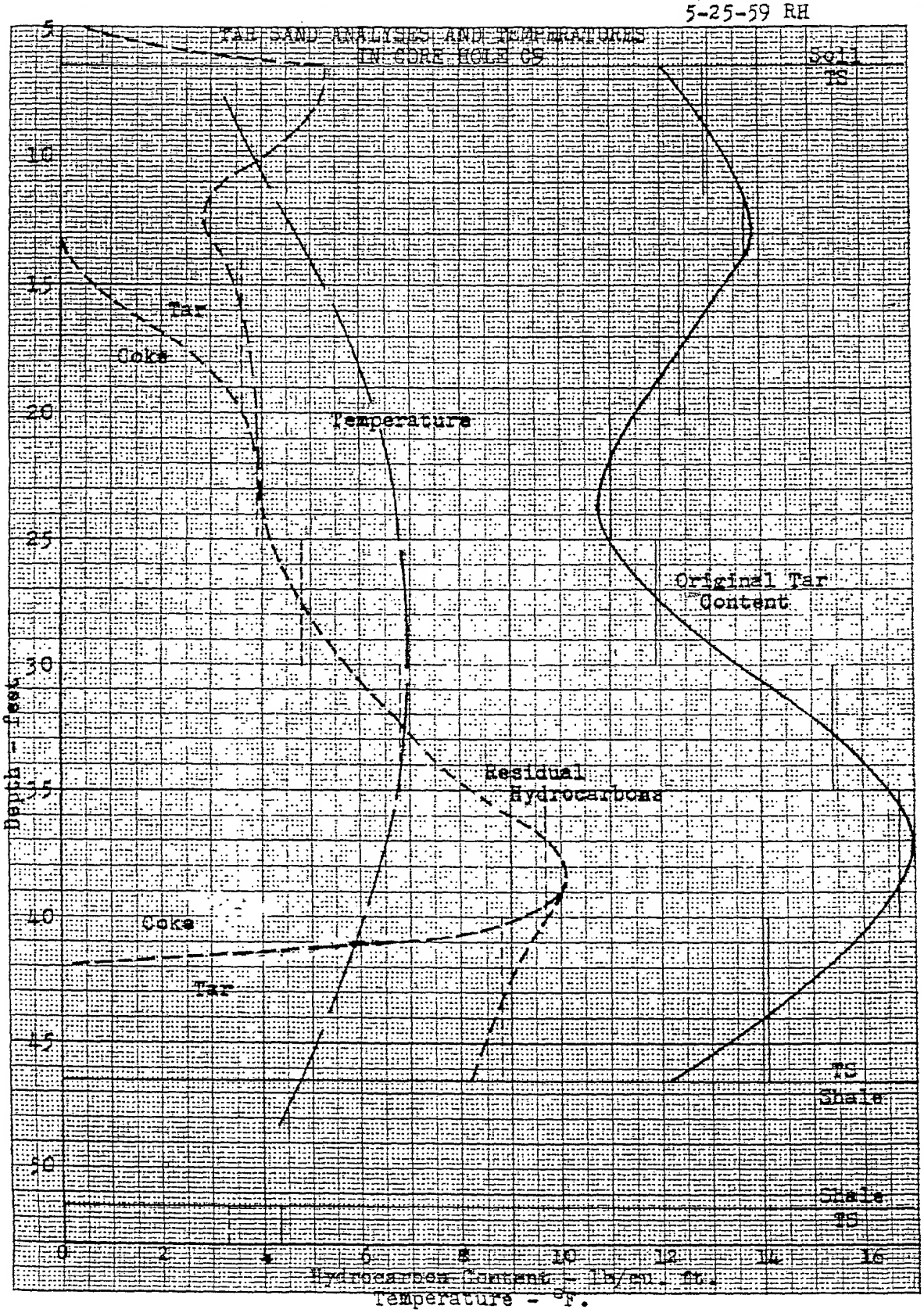


Figure 120

L9-215-10
5-19-59 RH

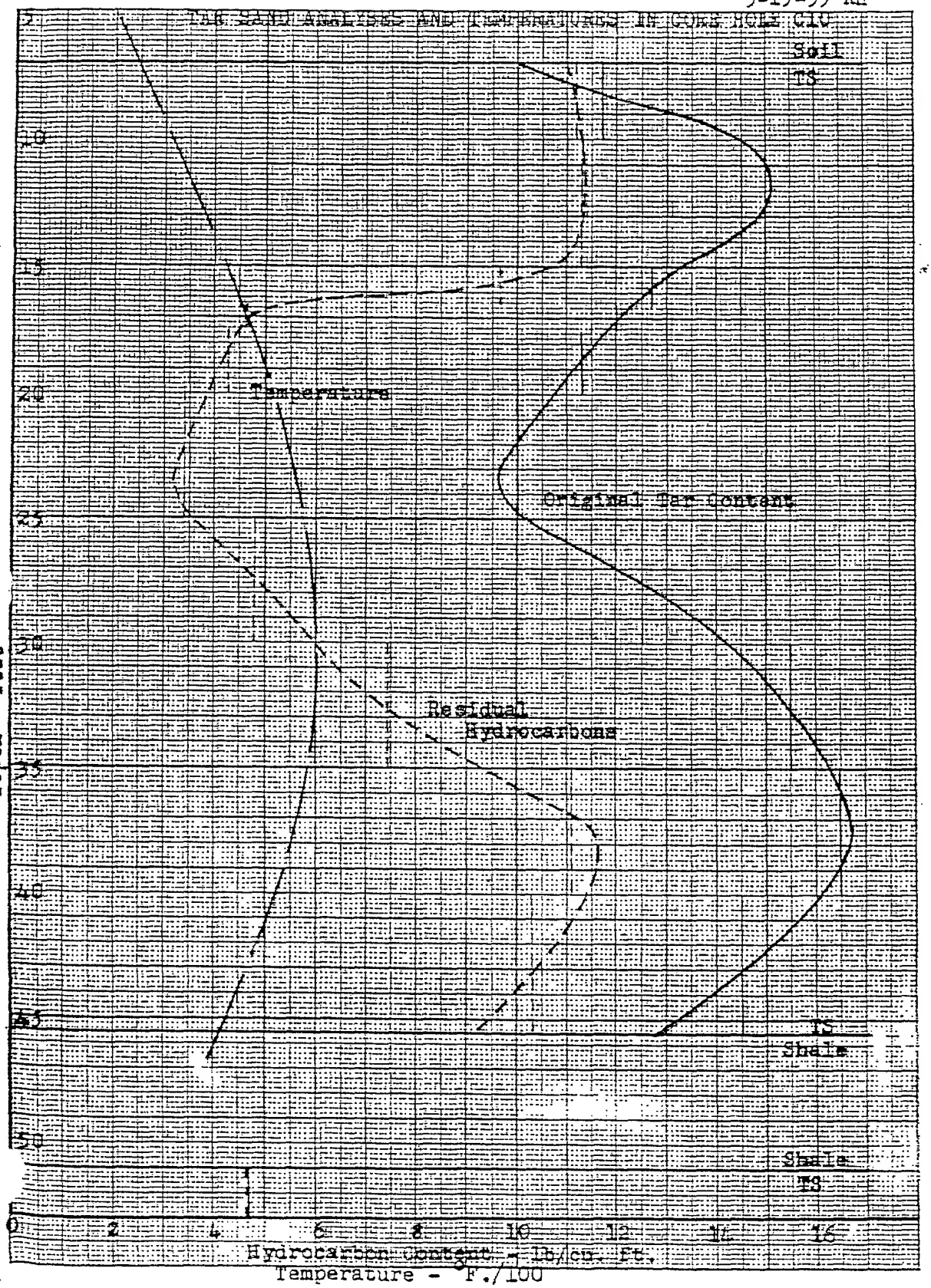


Figure 121

L9-215-11
5-19-59 RH

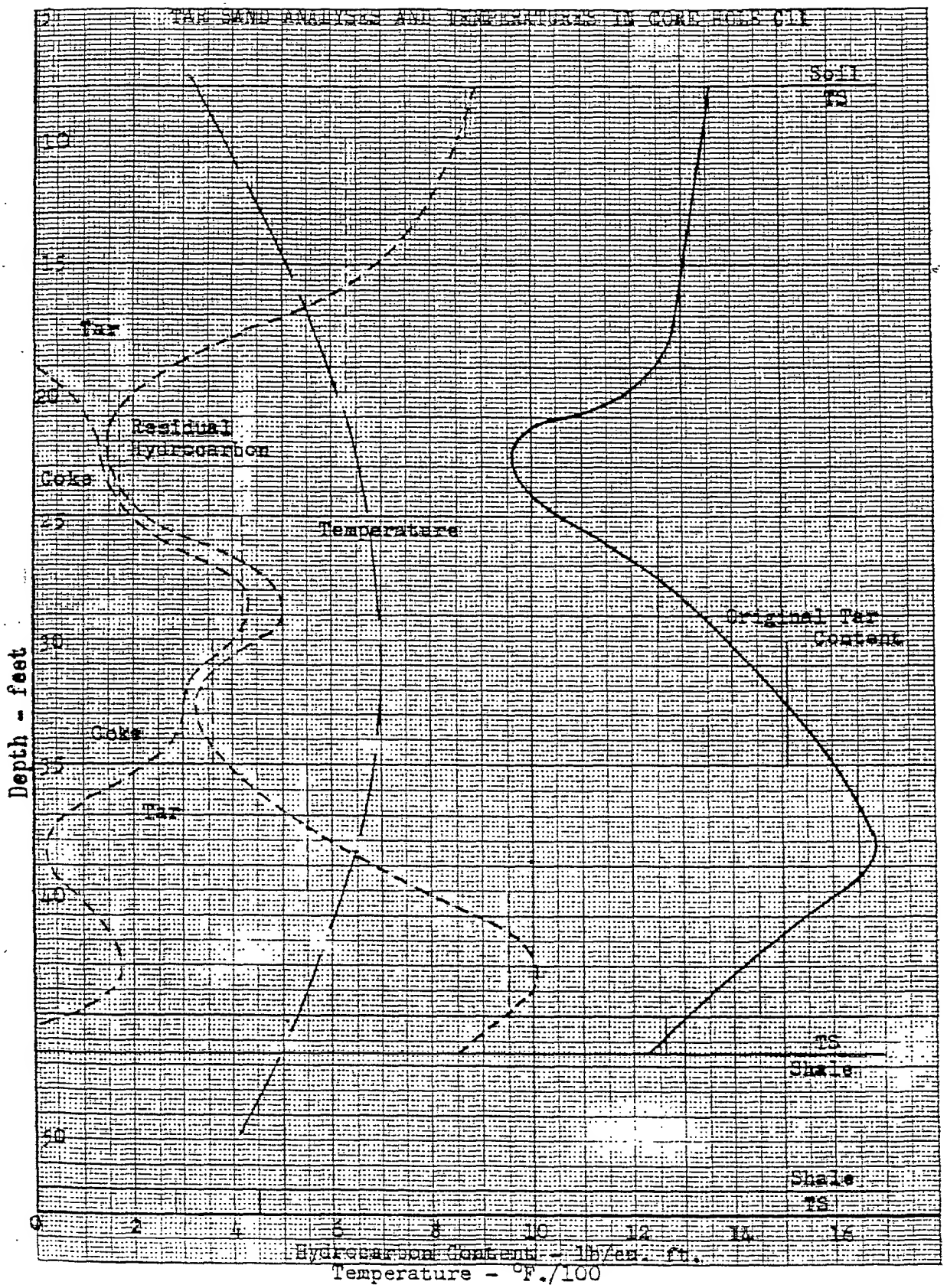


Figure 122

L9-215-12
5-27-59 RH

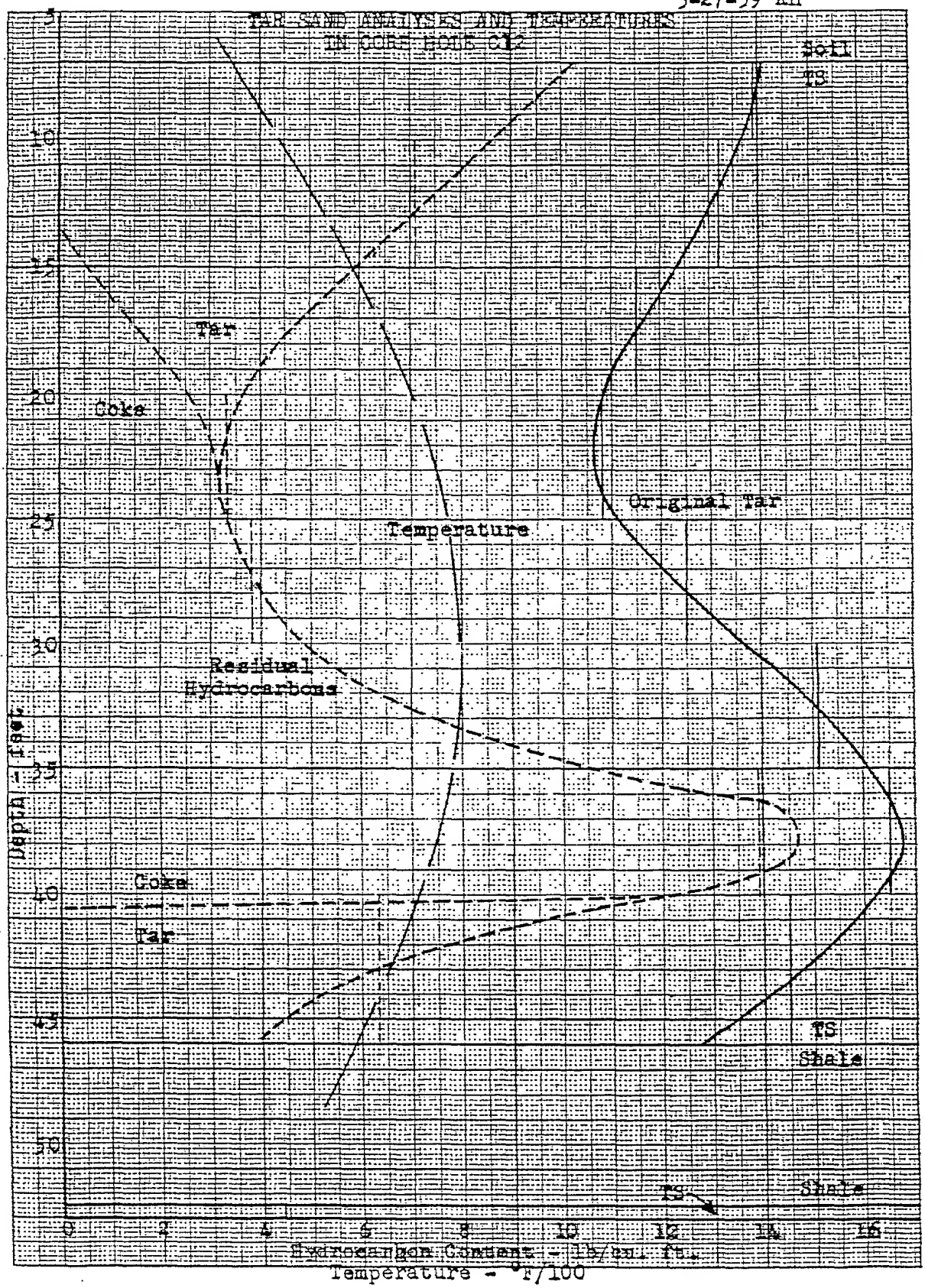


Figure 123

TAR SAND ANALYSES AND TEMPERATURES

L9-215-13
5-19-59 RH

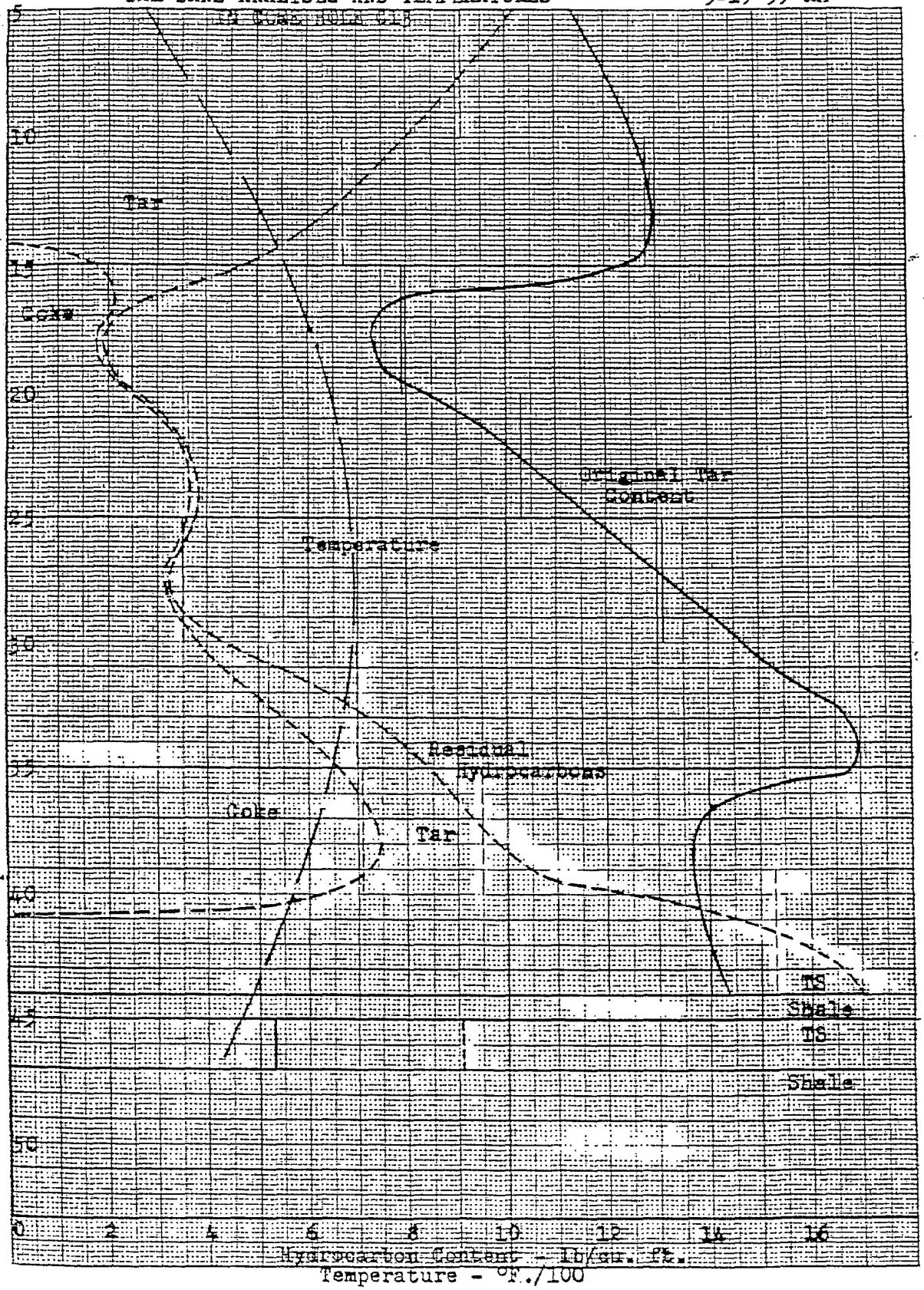


Figure 124

L9-215-14
5-19-59 RH

TAR SAND ANALYSES AND TEMPERATURES IN CORE HOLE C14

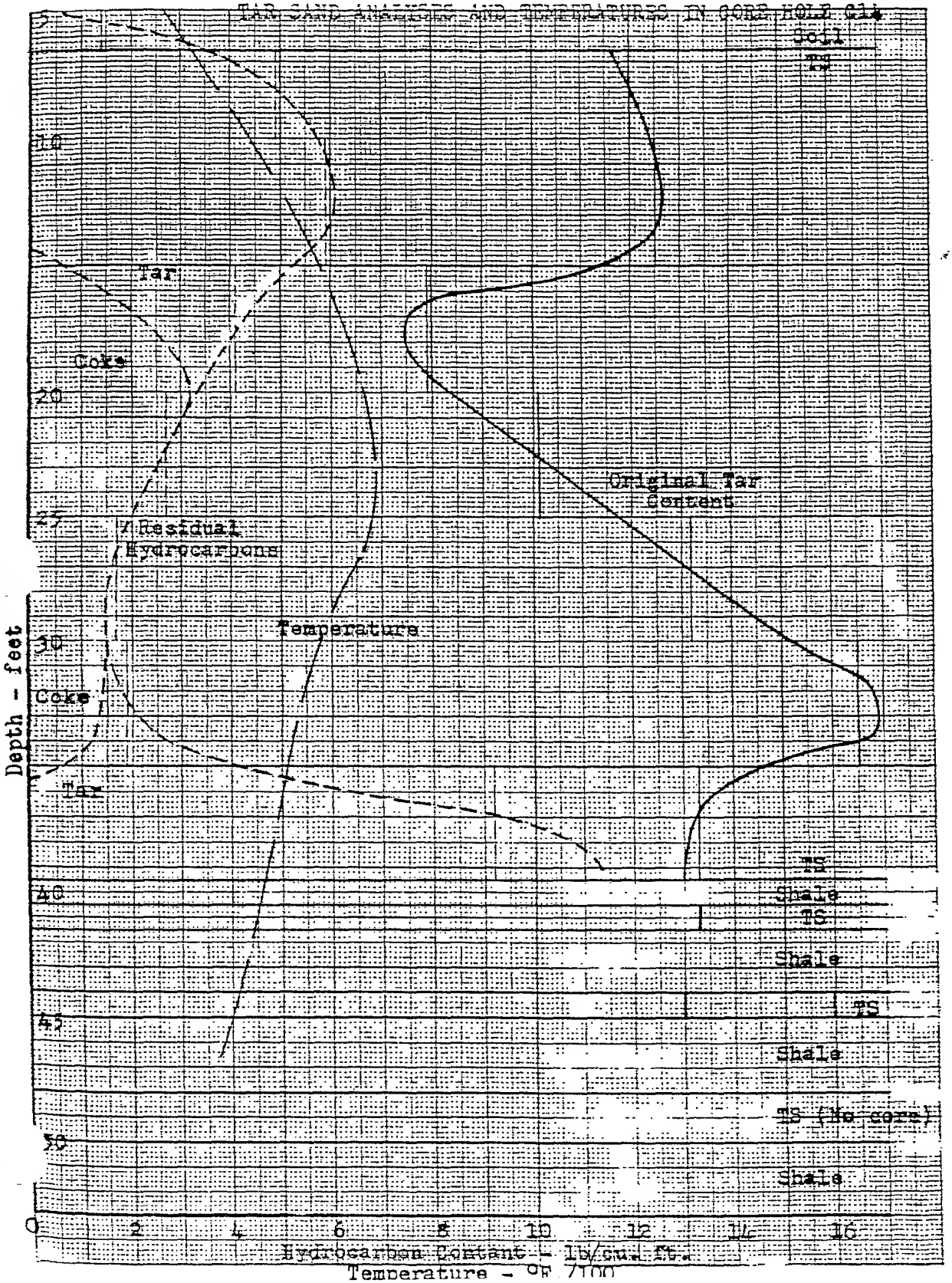


Figure 125

L9-215-15
5-27-59 RH

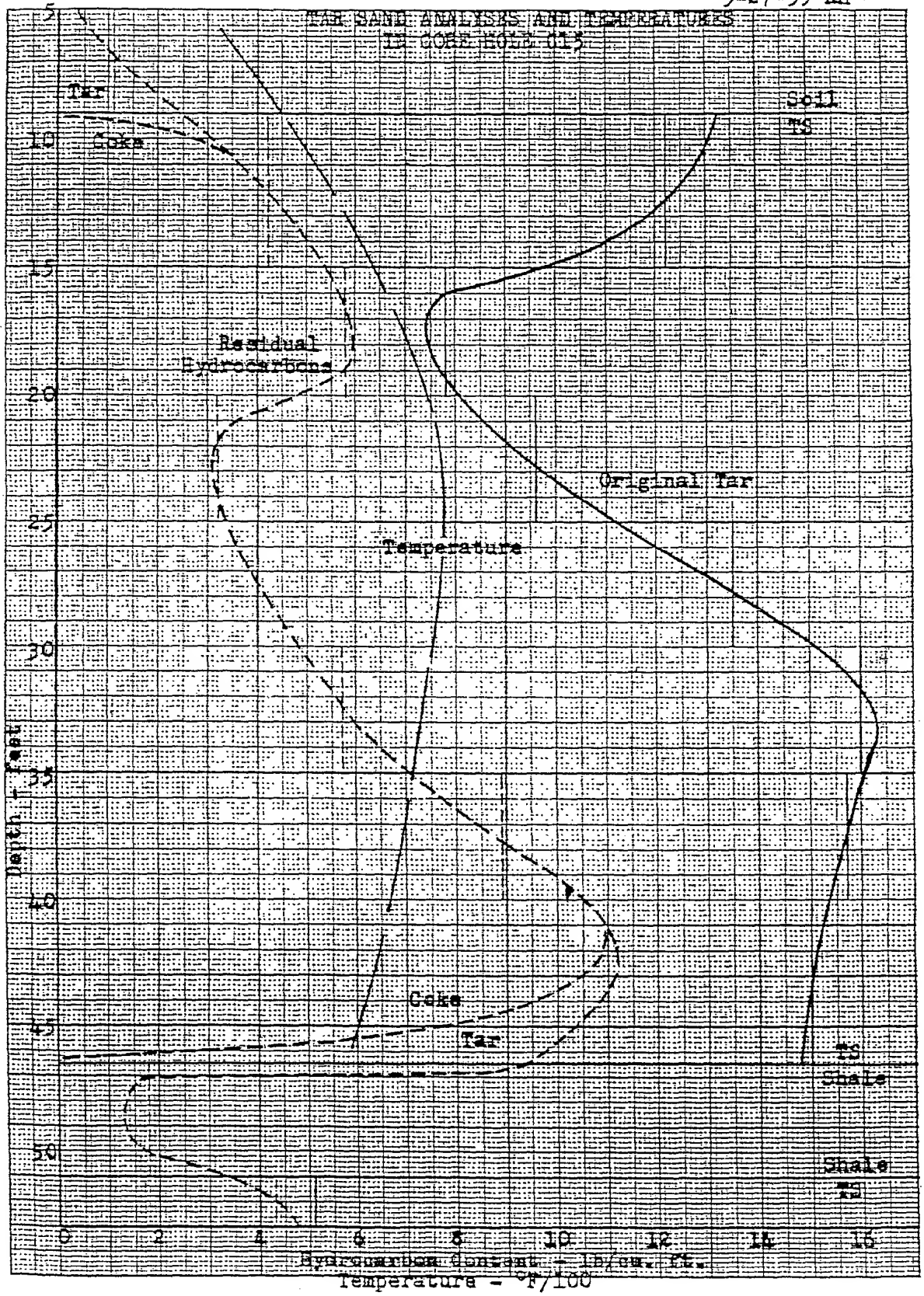


Figure 126

L9-215-16
5-14-59 RH

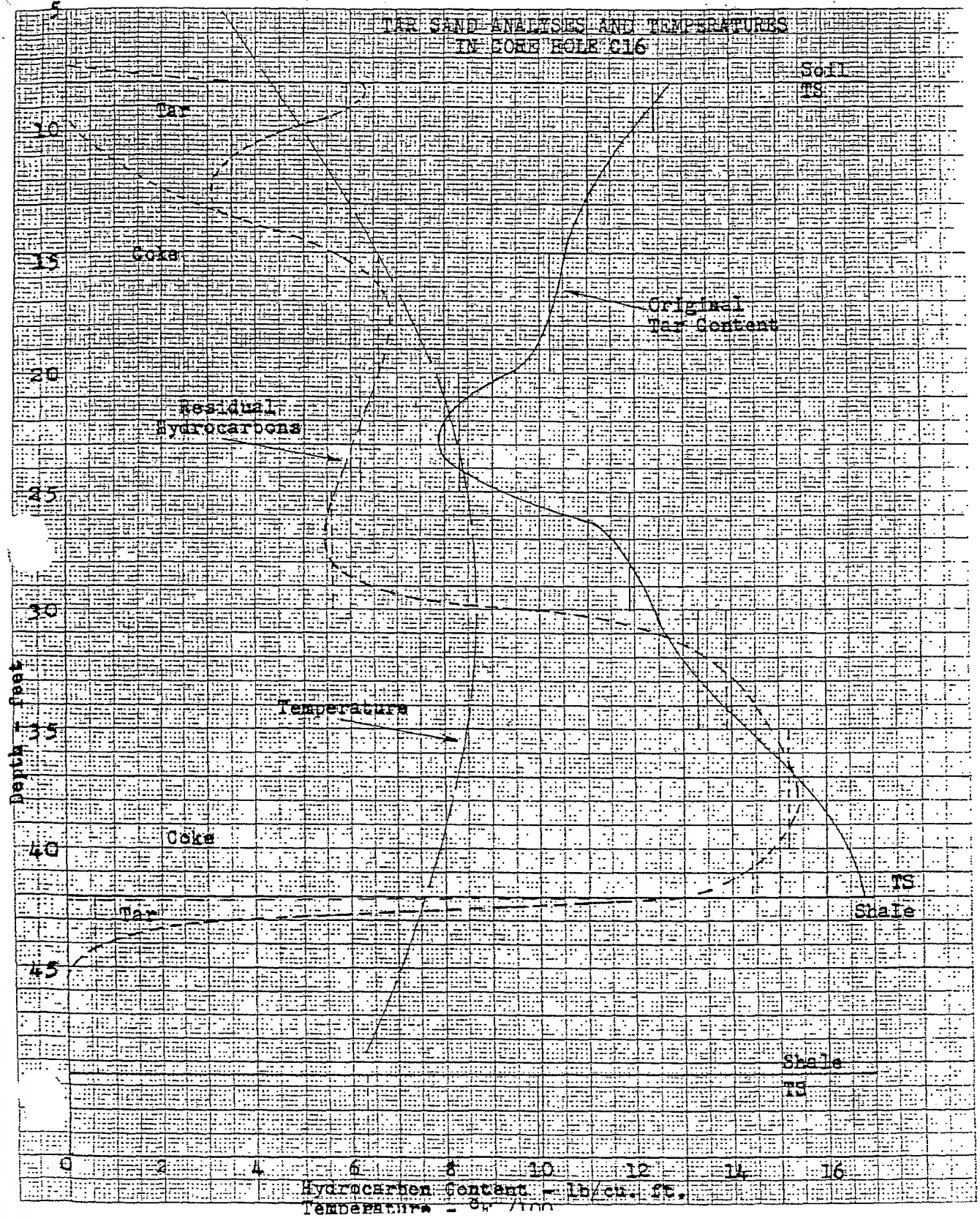
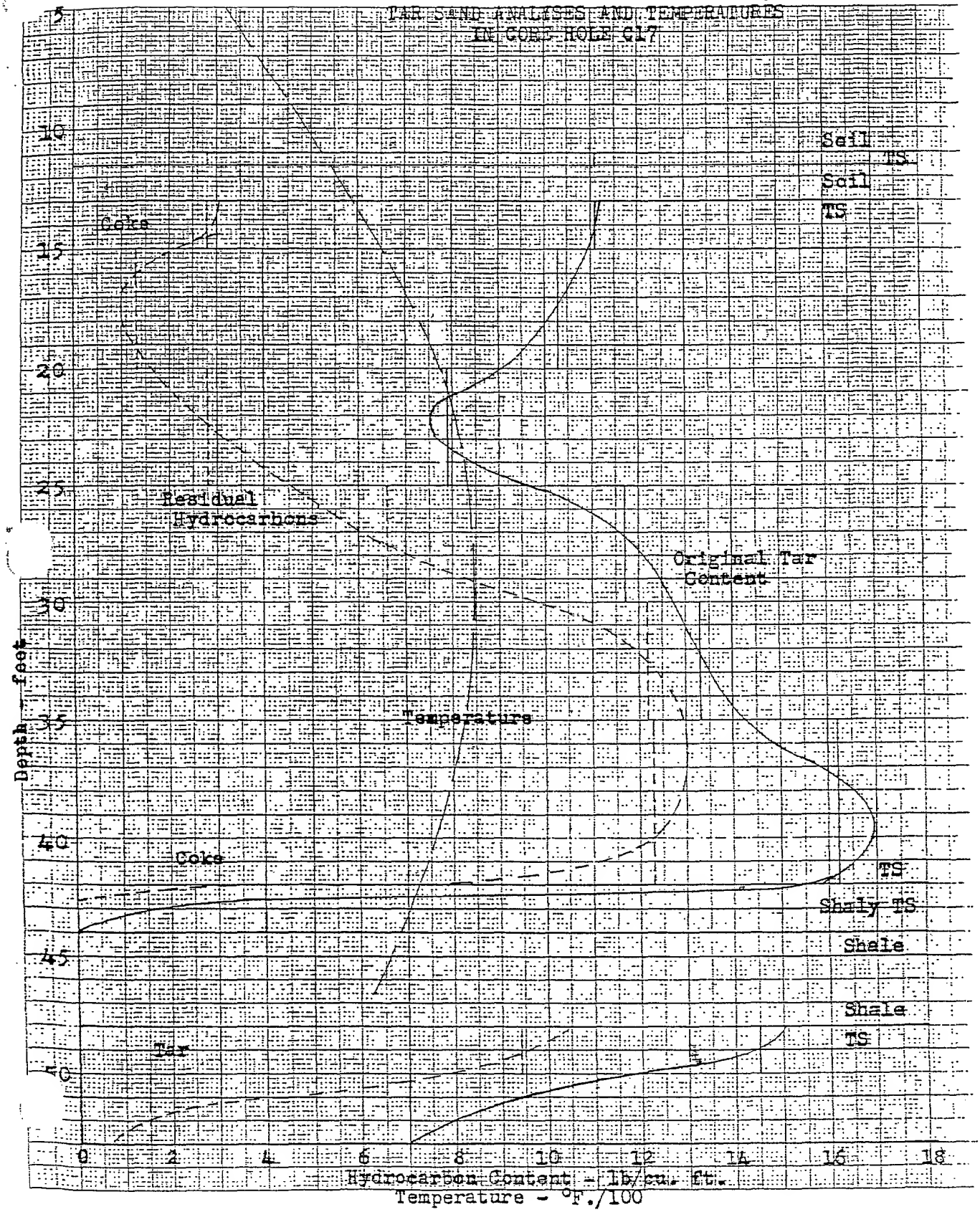


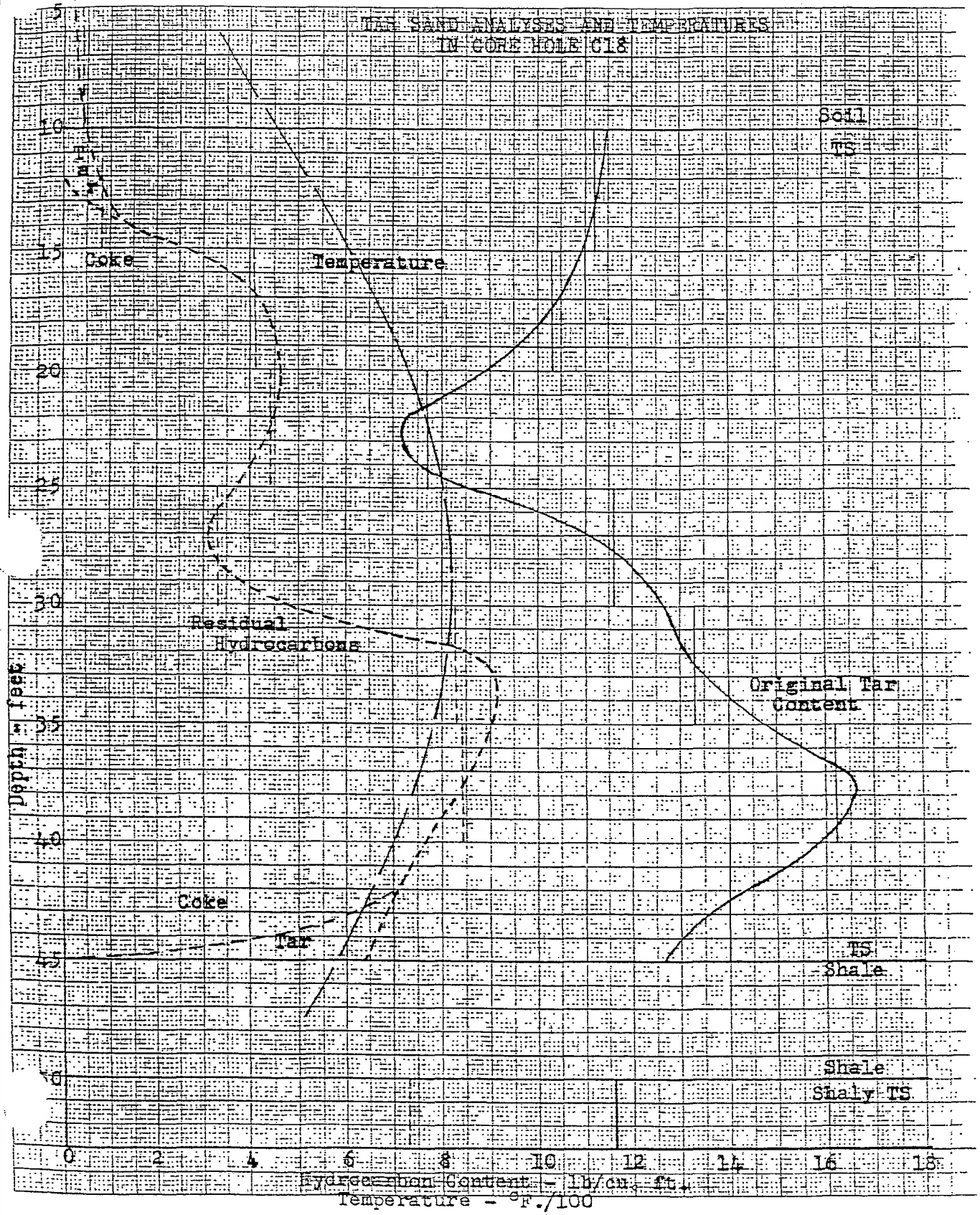
Figure 127

L9-215-17
5-18-59 RH



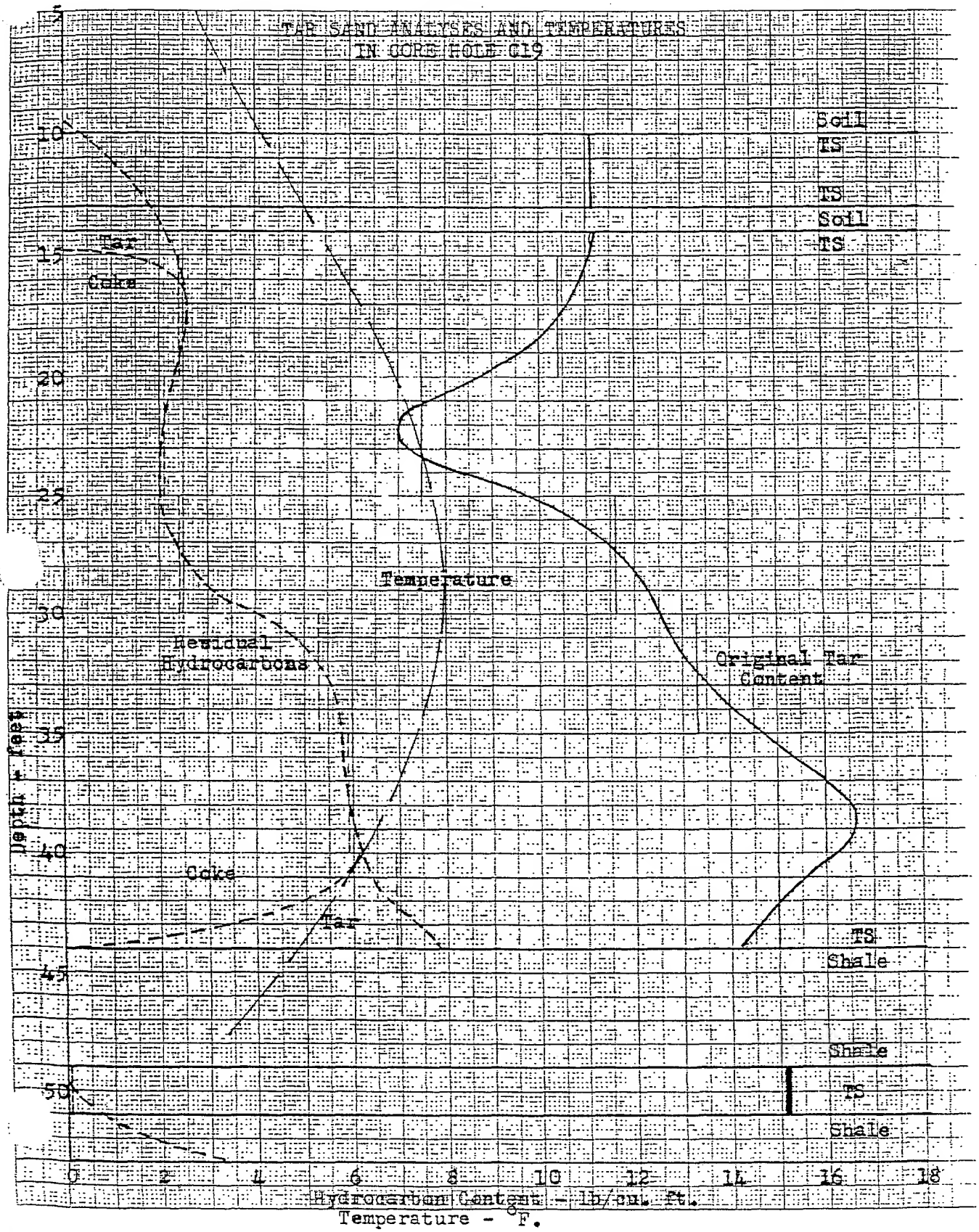
L9-215-18
5-18-59 RH

Figure 128



L9-215-19
5-18-59 RH

Figure 129



L9-215-20
5-18-59 RH

Figure 130

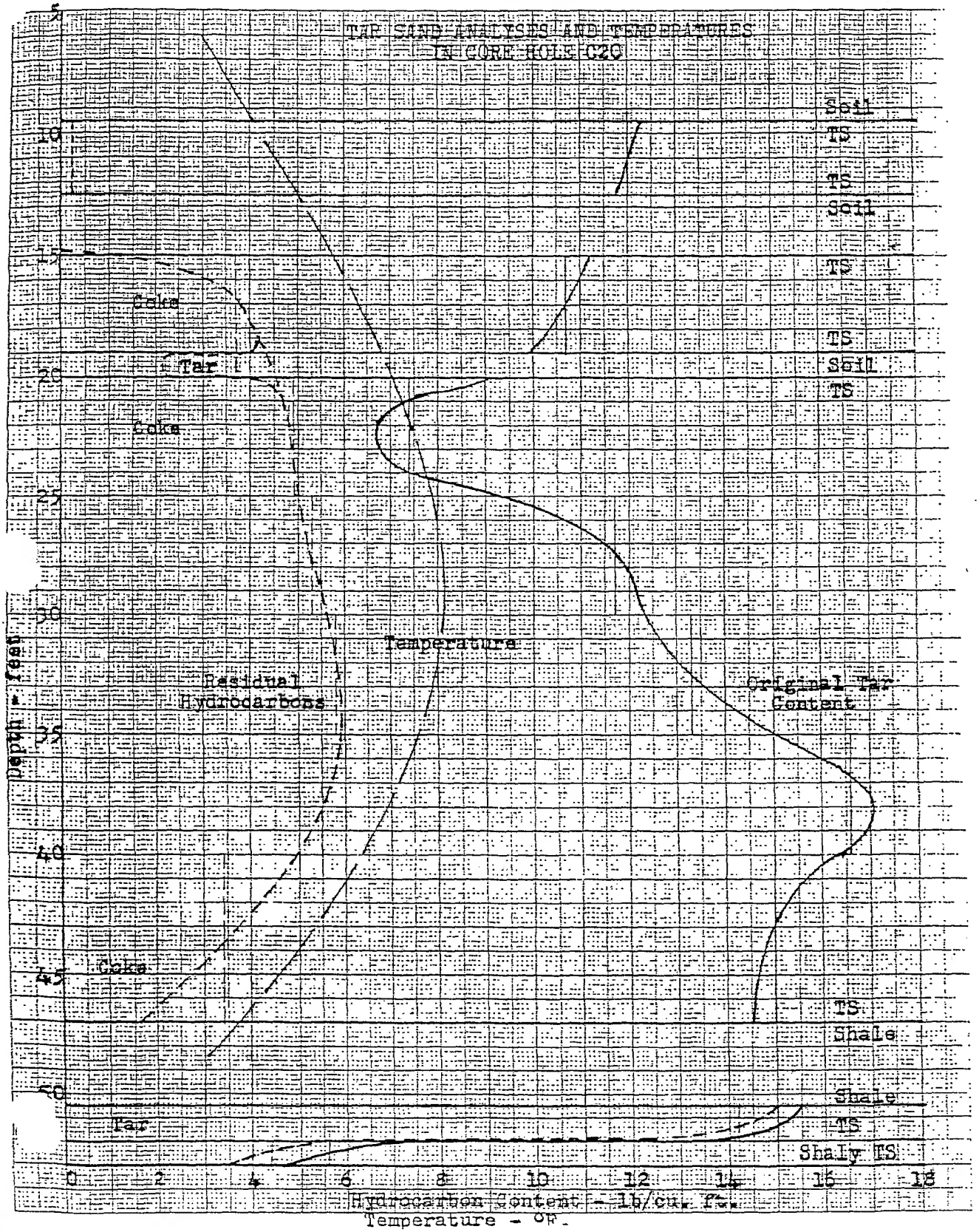


Figure 131

L9-215-21
5-18-59

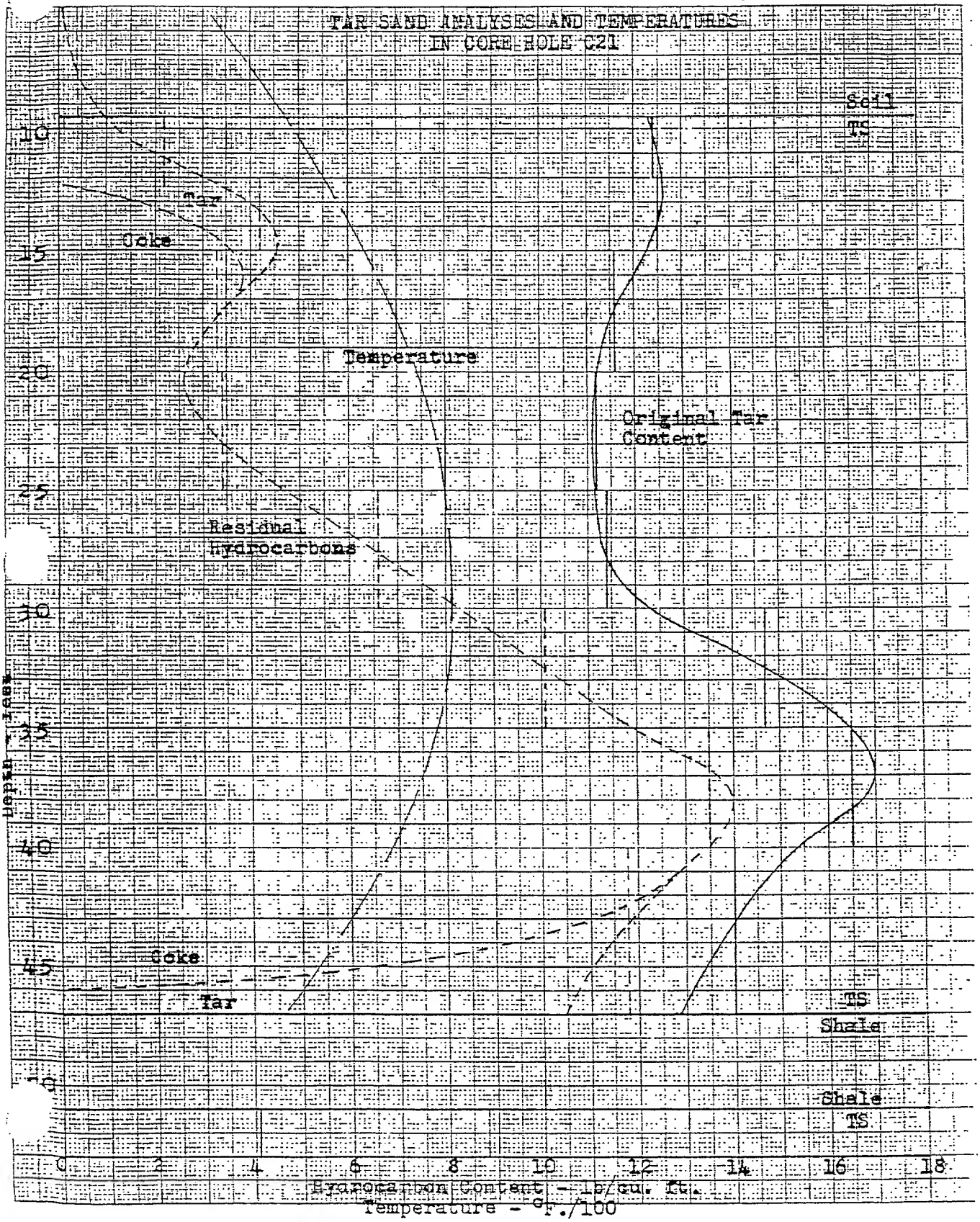


Figure 132

L9-215-22
5-18-59 RH

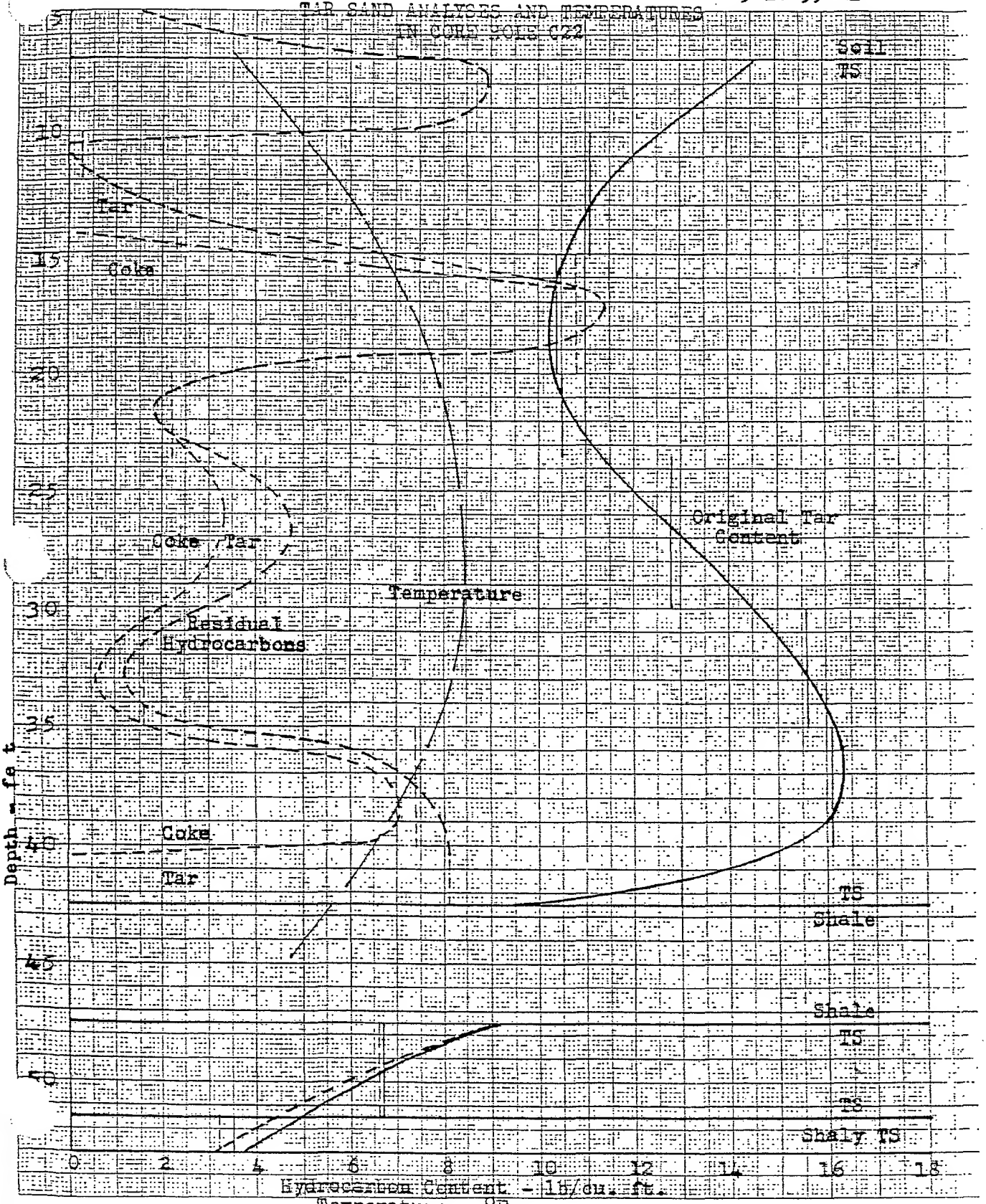
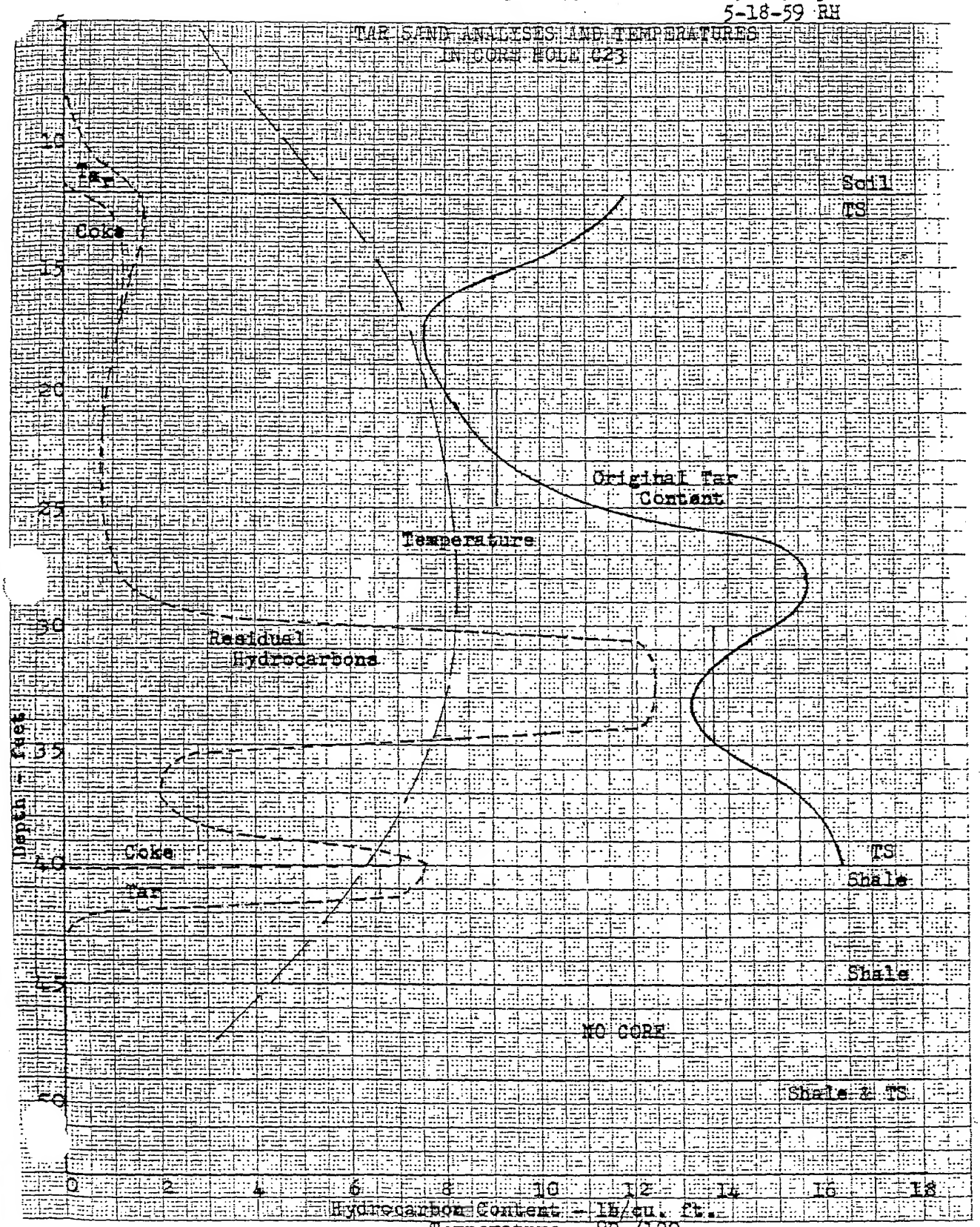


Figure 133 L9-215-23
5-18-59 RH



L9-215-24
5-27-59 RH

Figure 134

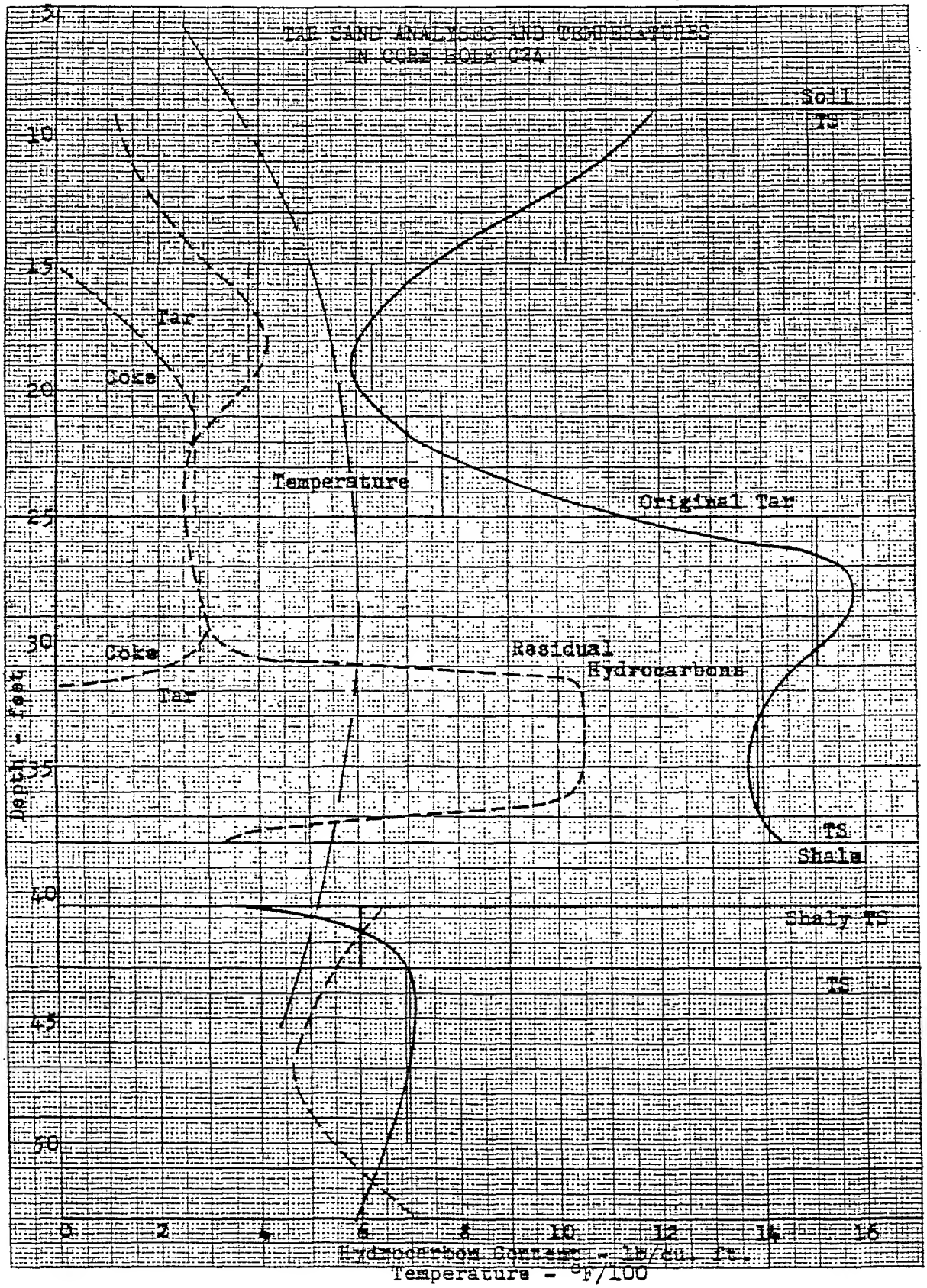
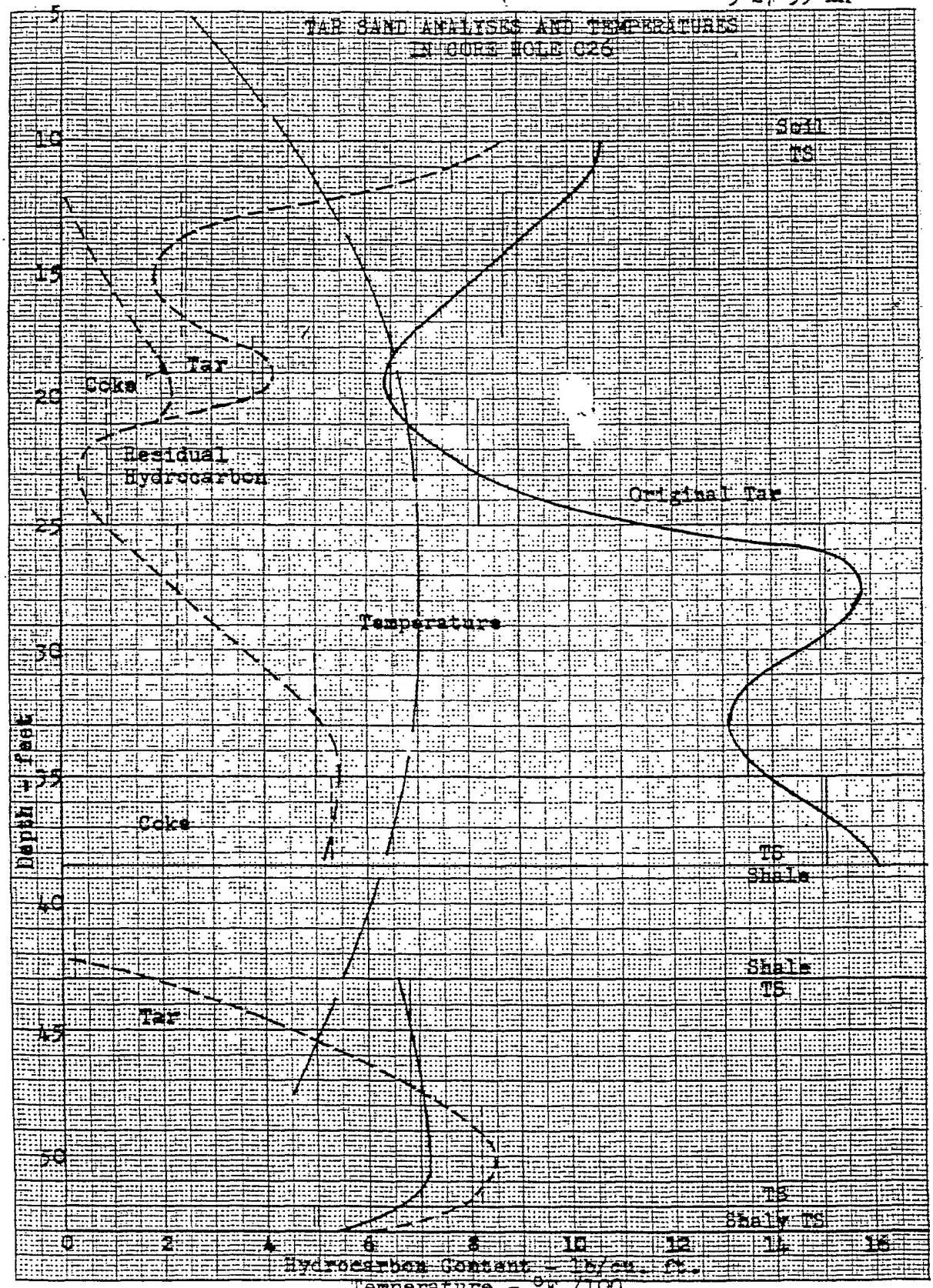


Figure 135

L9-215-26
5-27-59 RH



L9-215-27
5-18-59 RH

Figure 136

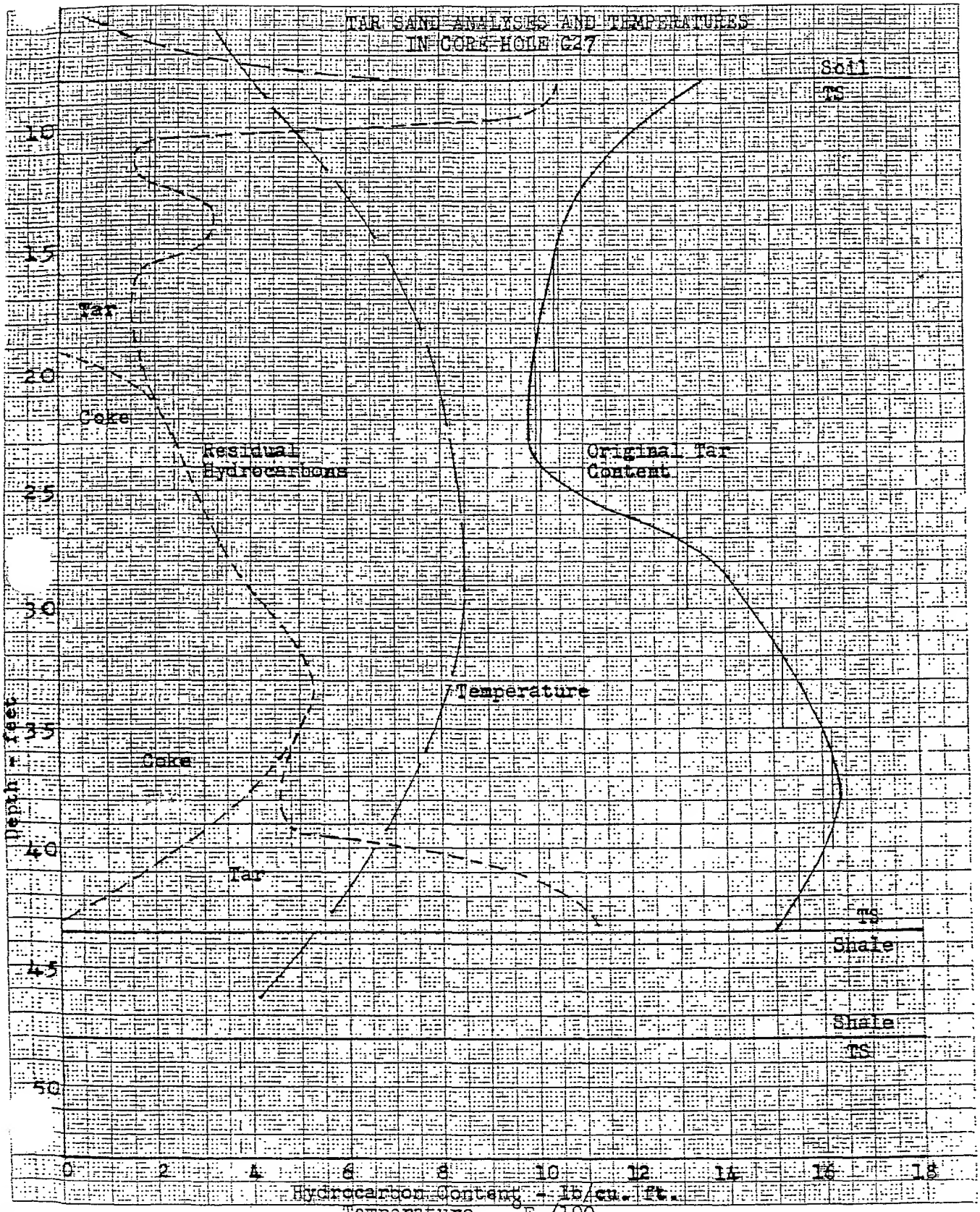


Figure 137

L9-215-28
5-18-59 RH

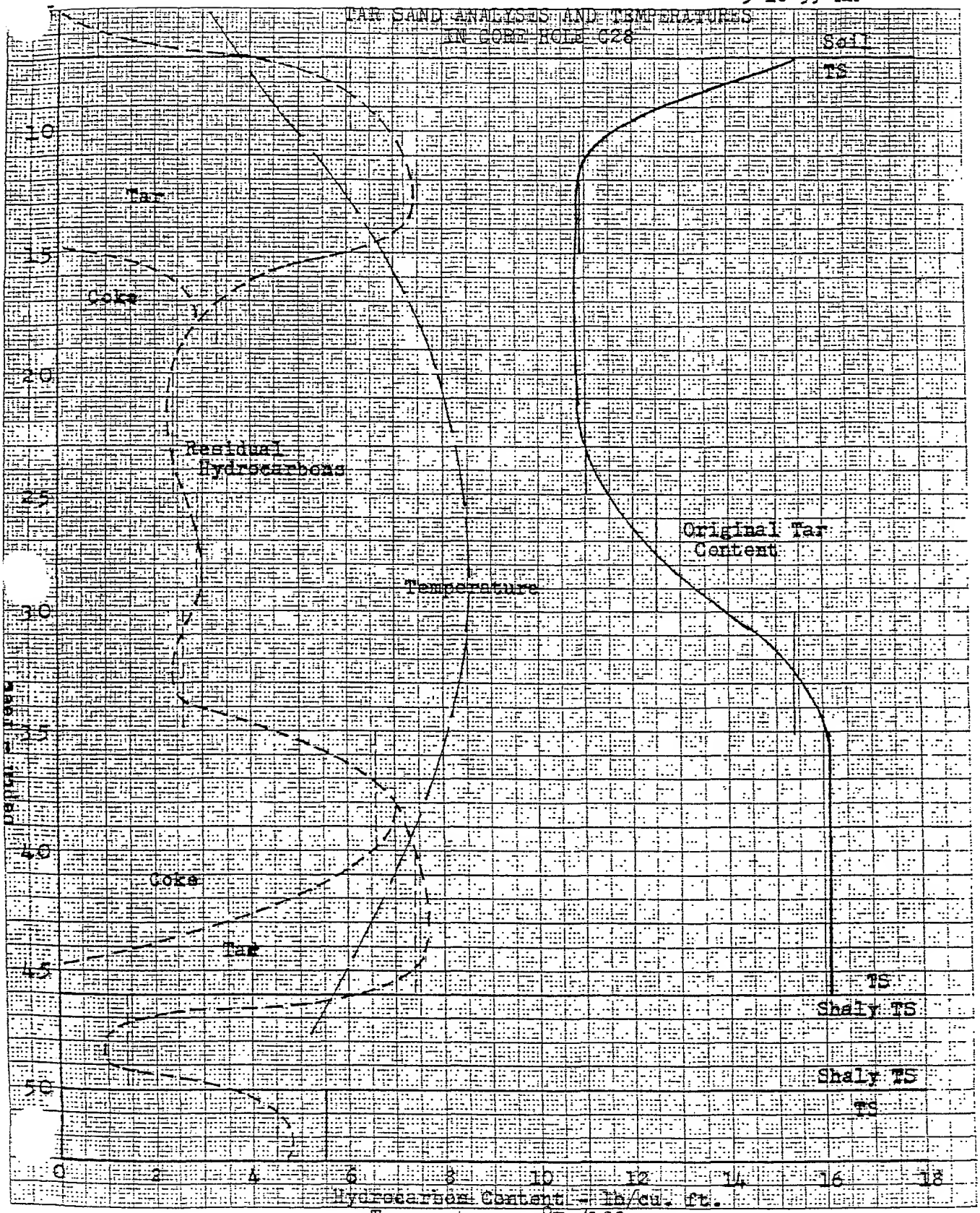


Figure 138

TAR SAND ANALYSES
AND TEMPERATURES
IN CORE HOLE C29

L9-215-29
5-18-59 RH.

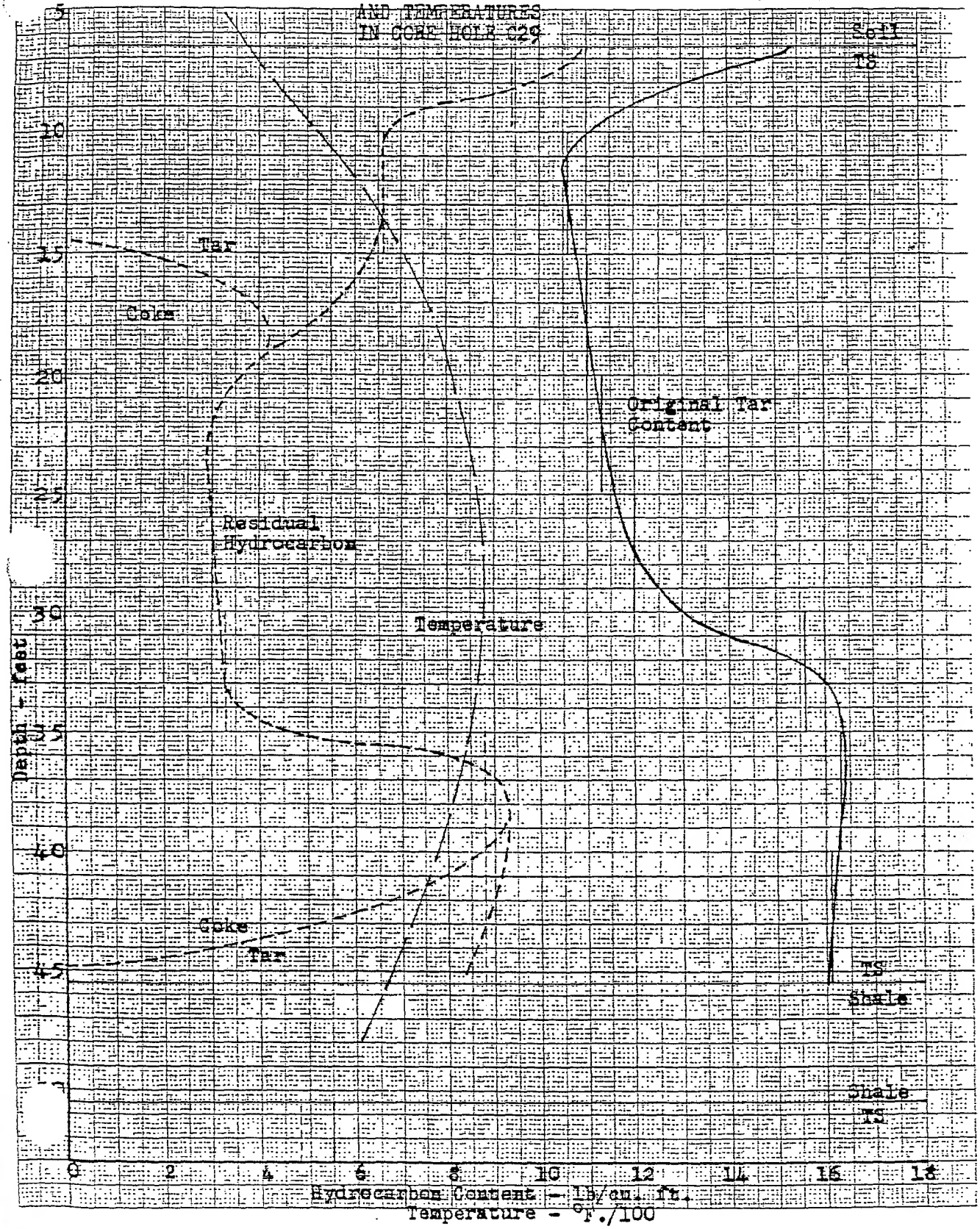


Figure 139

TAR SAND ANALYSES IN CORE HOLE C30

L9-215-30
5-18-59 RH

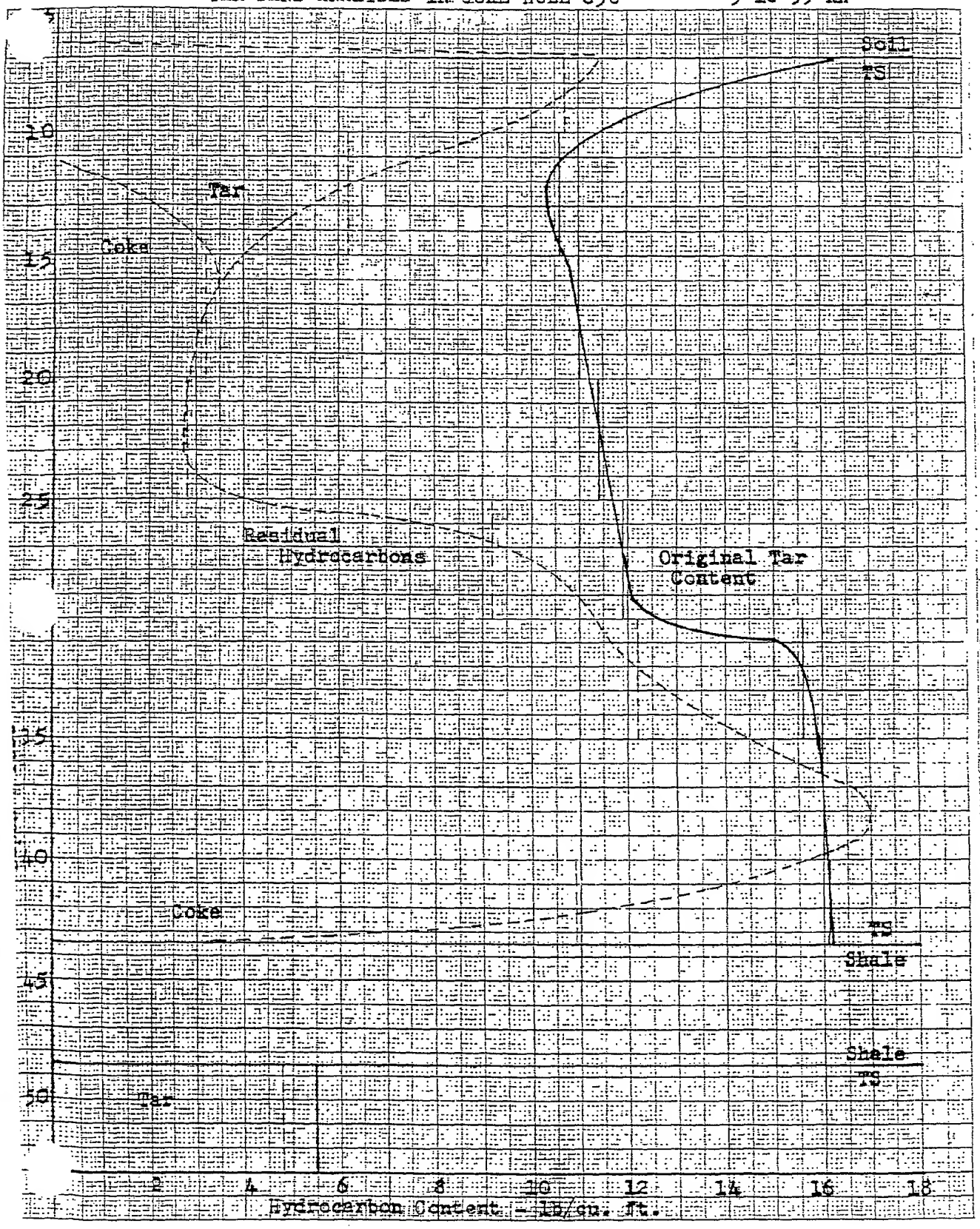


Figure 140

L9-215-31
5-18-59 RH

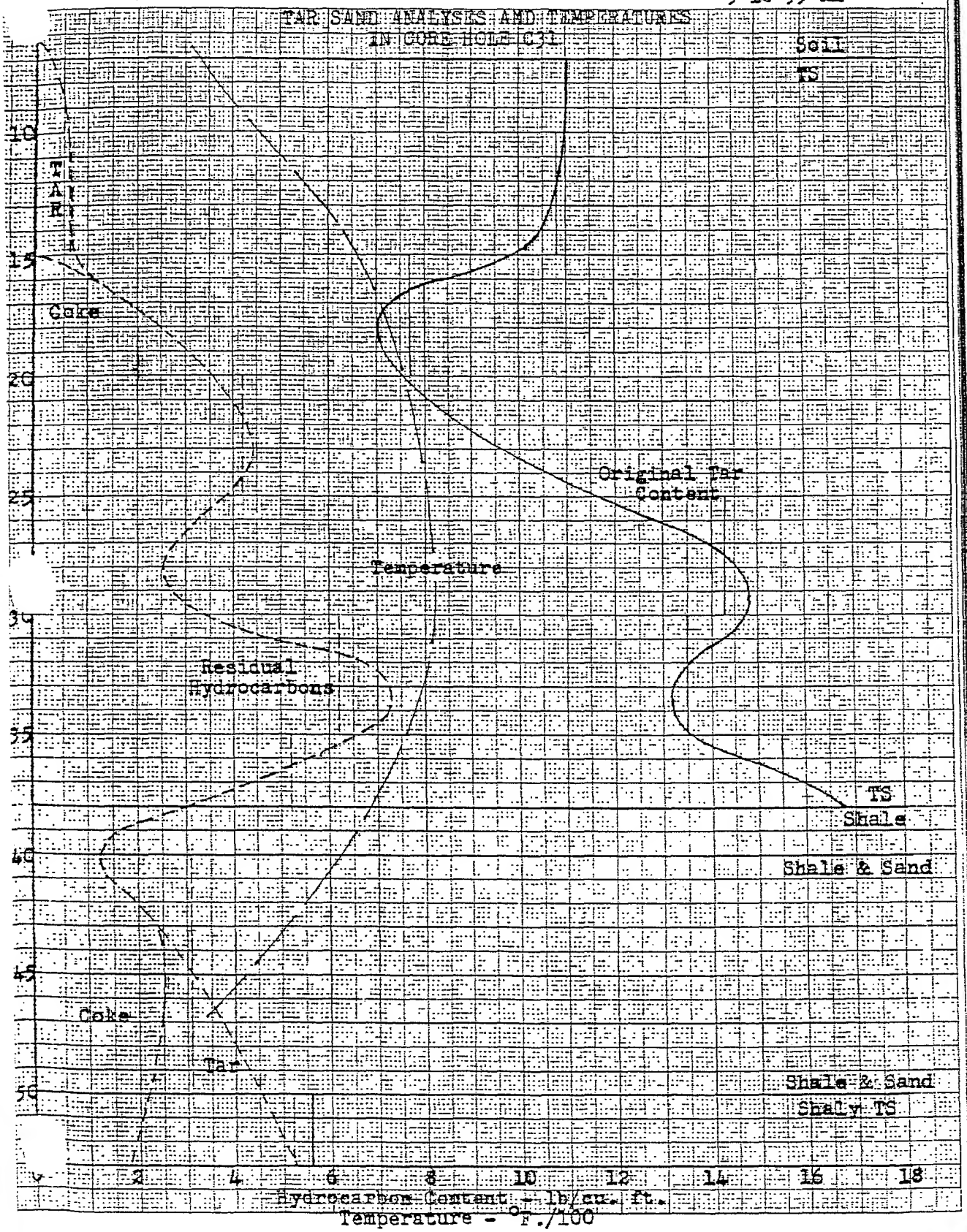
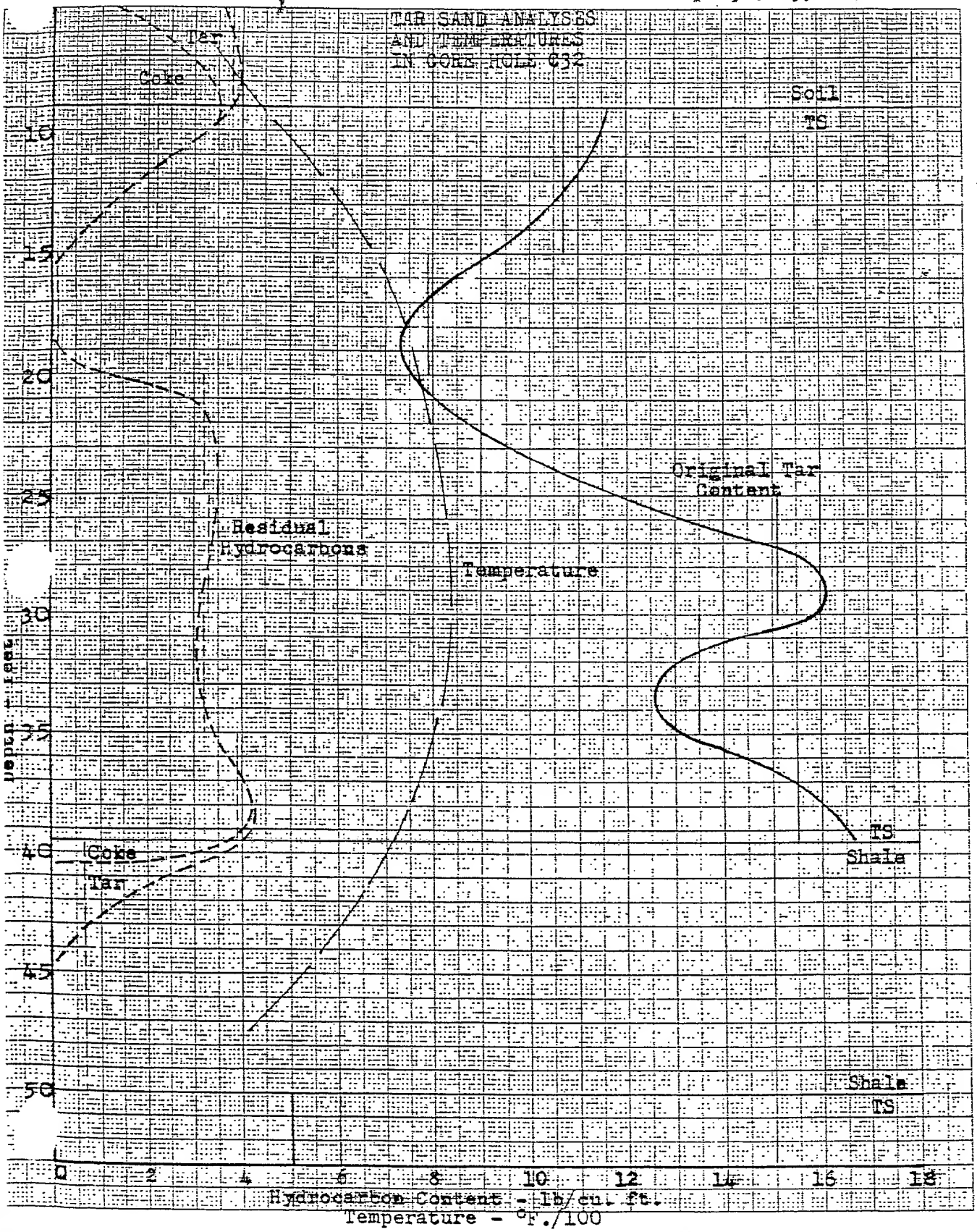


Figure 141

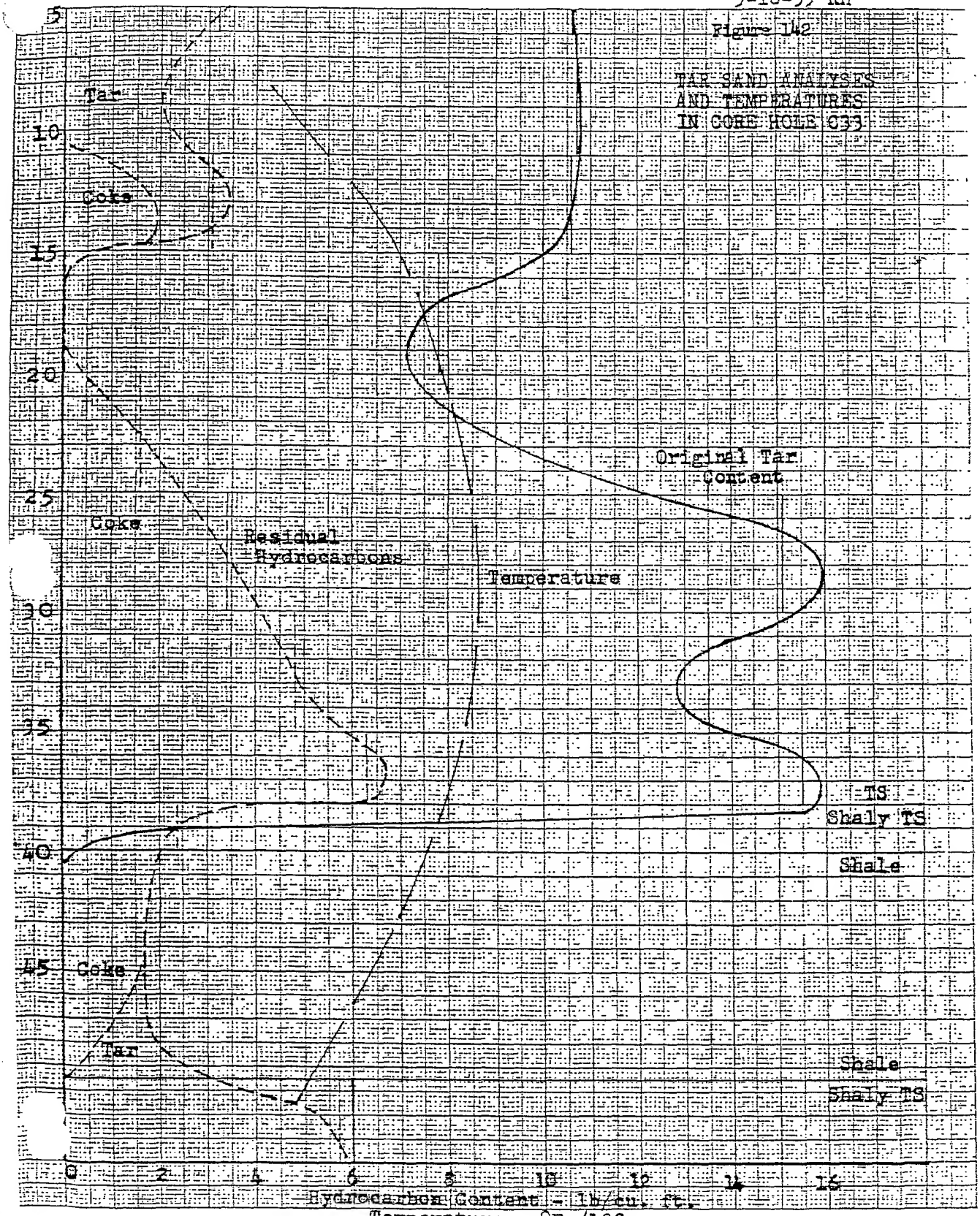
L9-215-32
5-18-59 RH



L9-215-33
5-18-59 RH

Figure 142

TAR SAND ANALYSES
AND TEMPERATURES
IN CORE HOLE C33



L9-215-34
5-19-59 RH

Figure 143

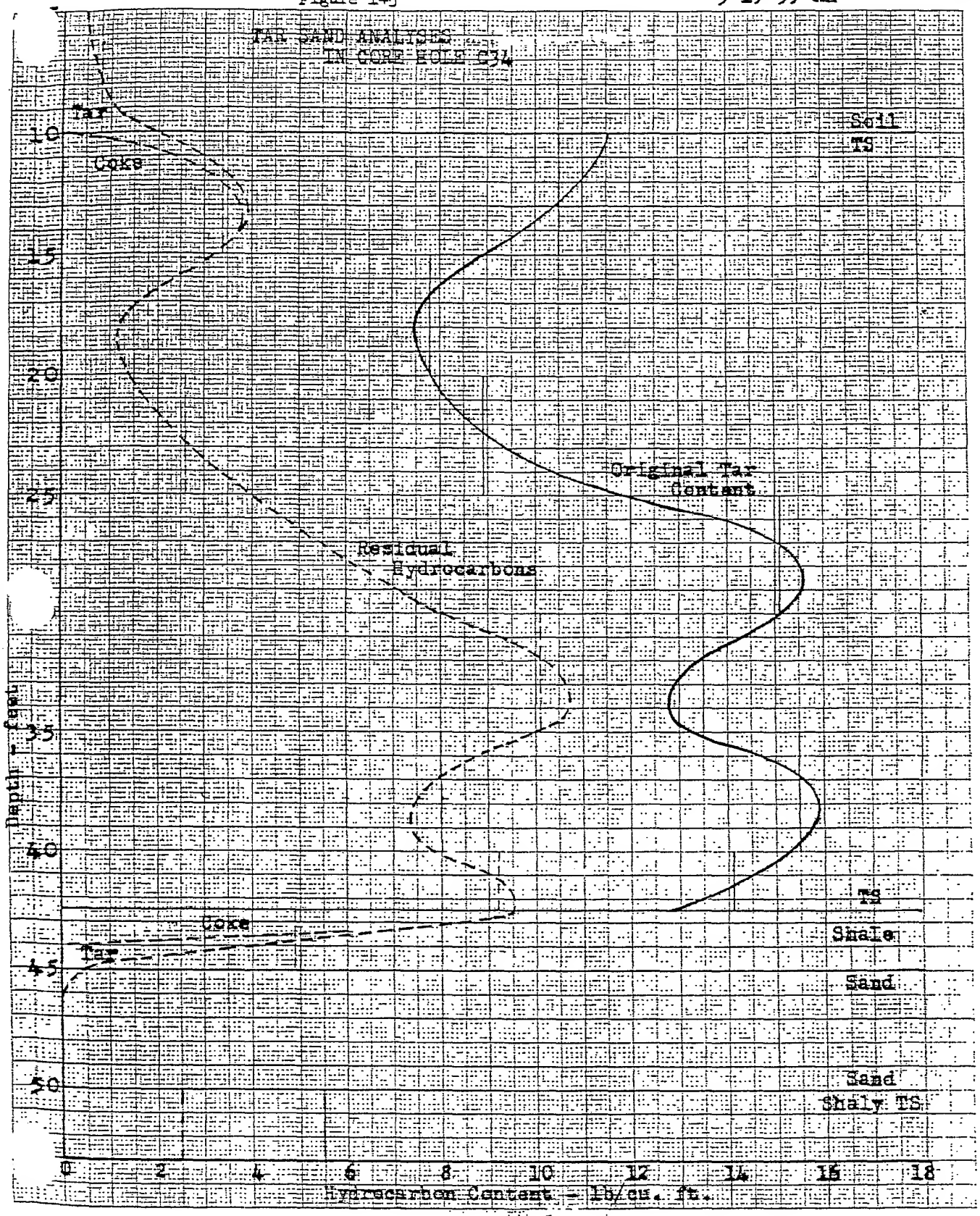
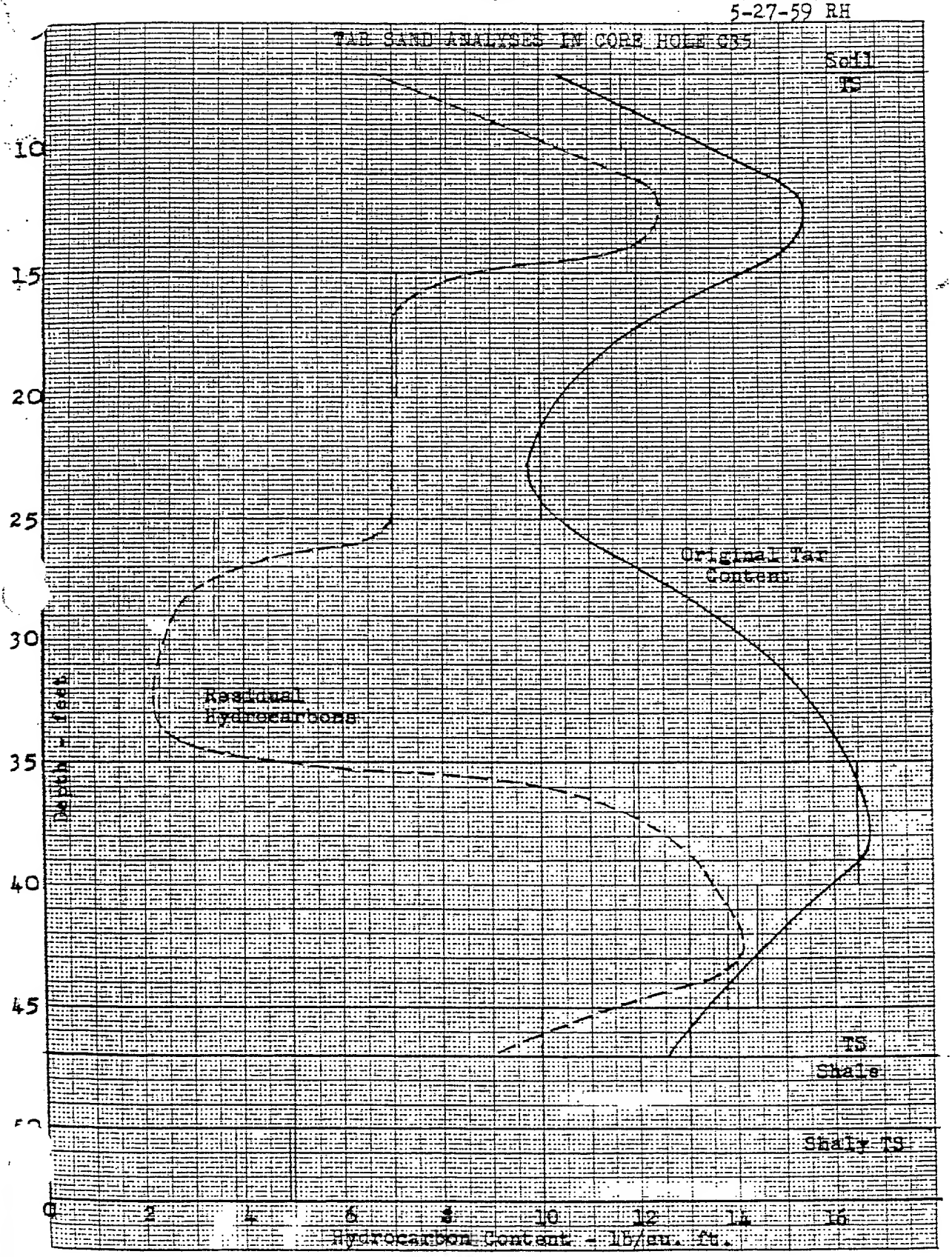


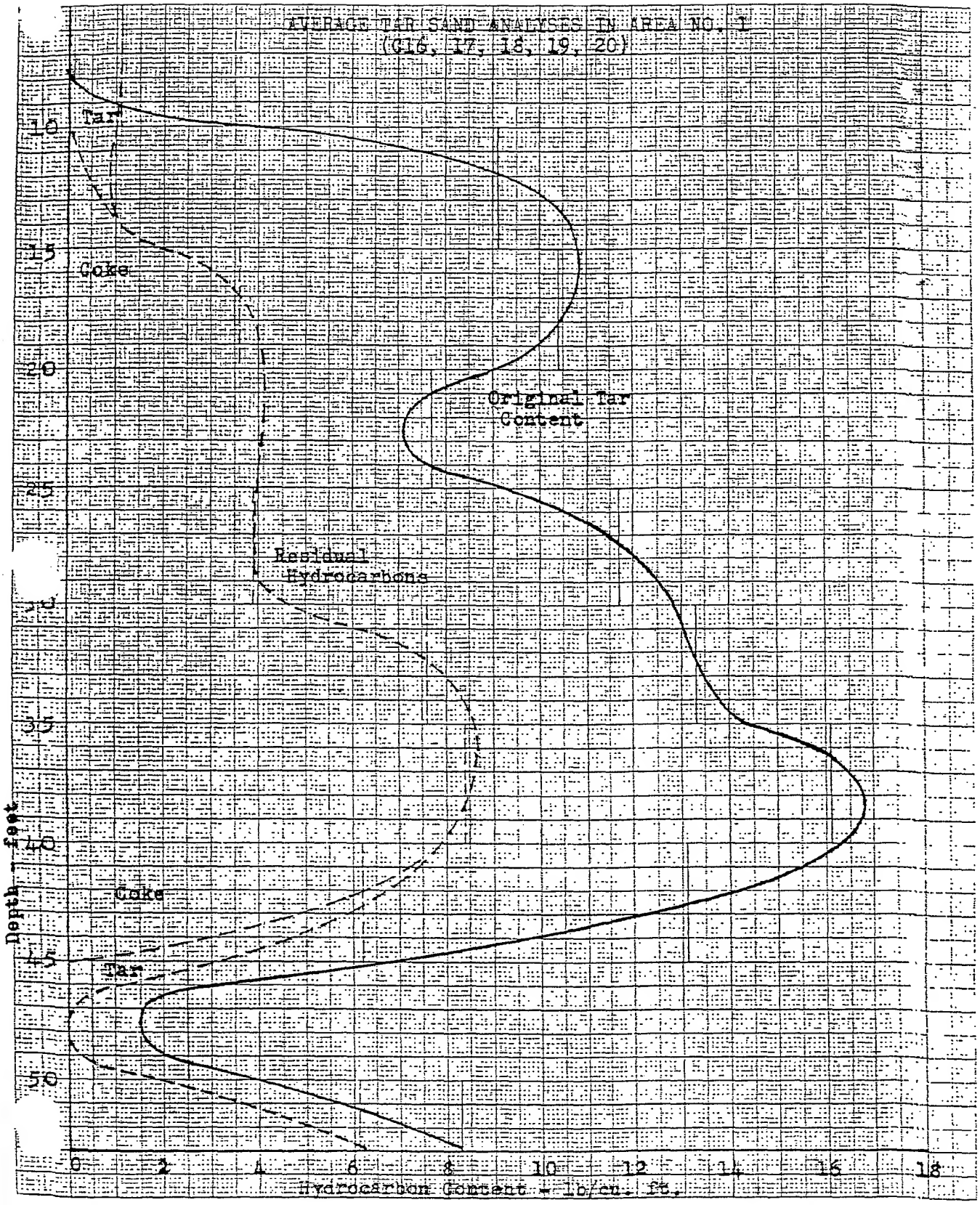
Figure 144

L9-215-35
5-27-59 RH



L9-216-1
5-18-59 RH

Figure 145



L9-216-2
5-18-59 RH

Figure 146

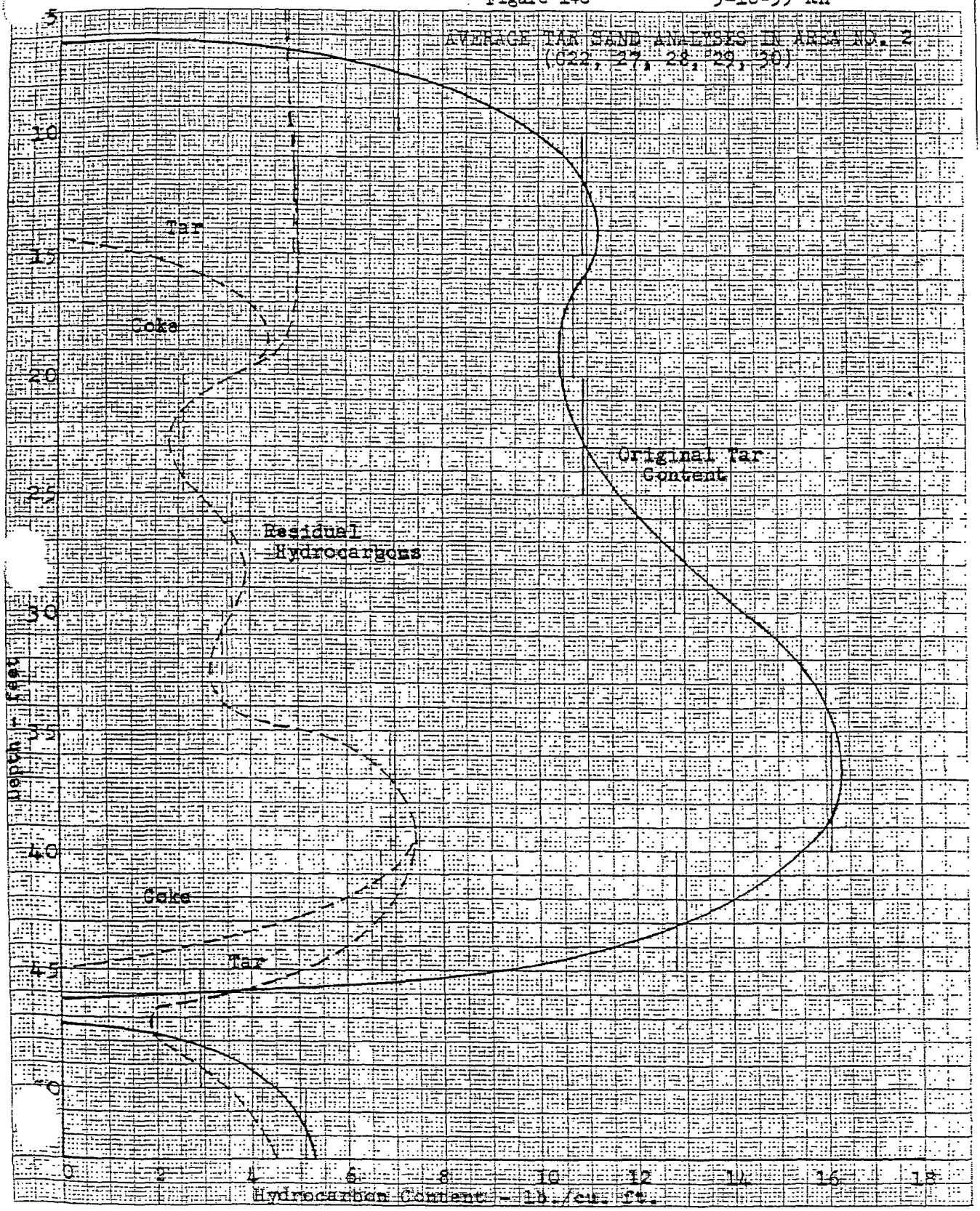
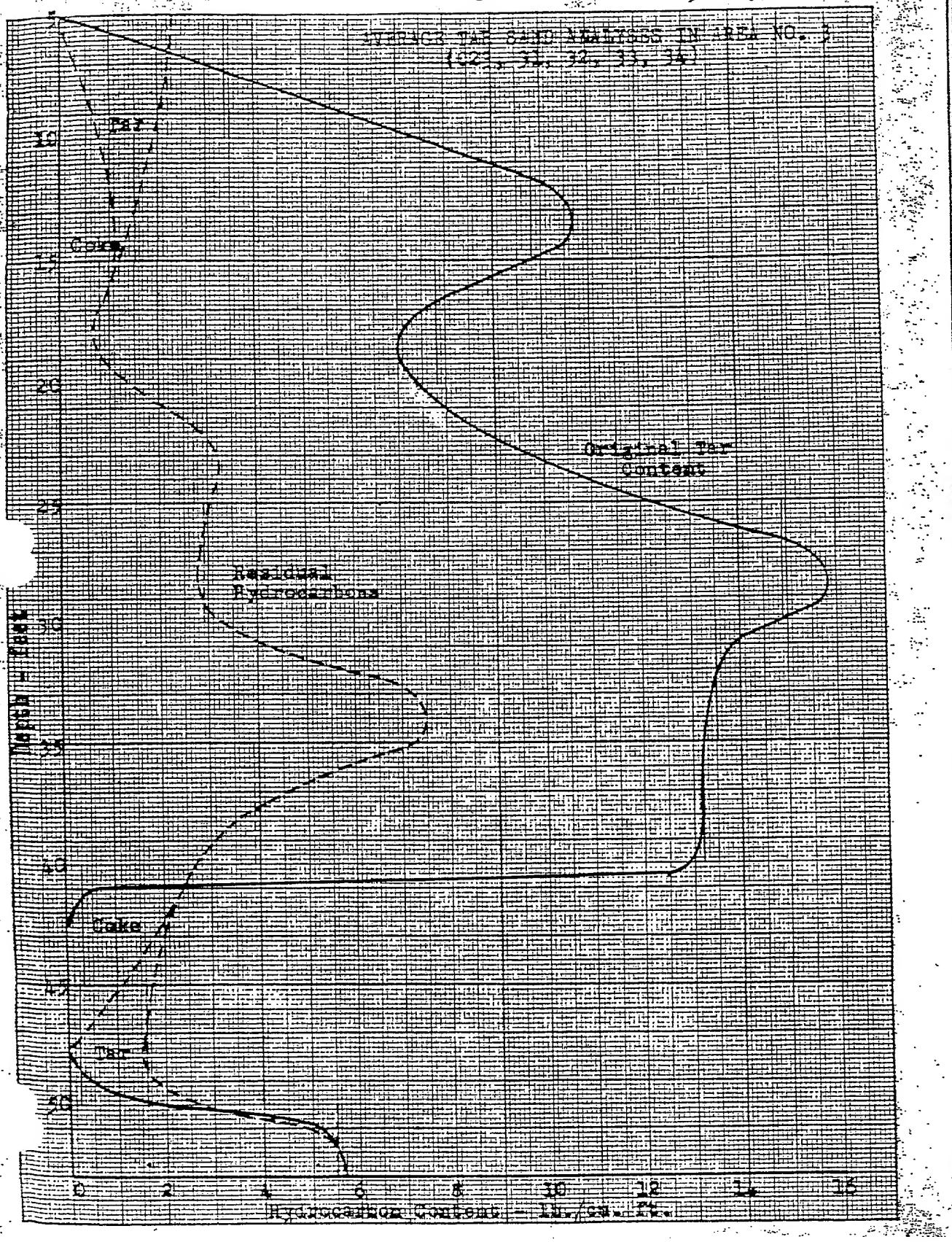


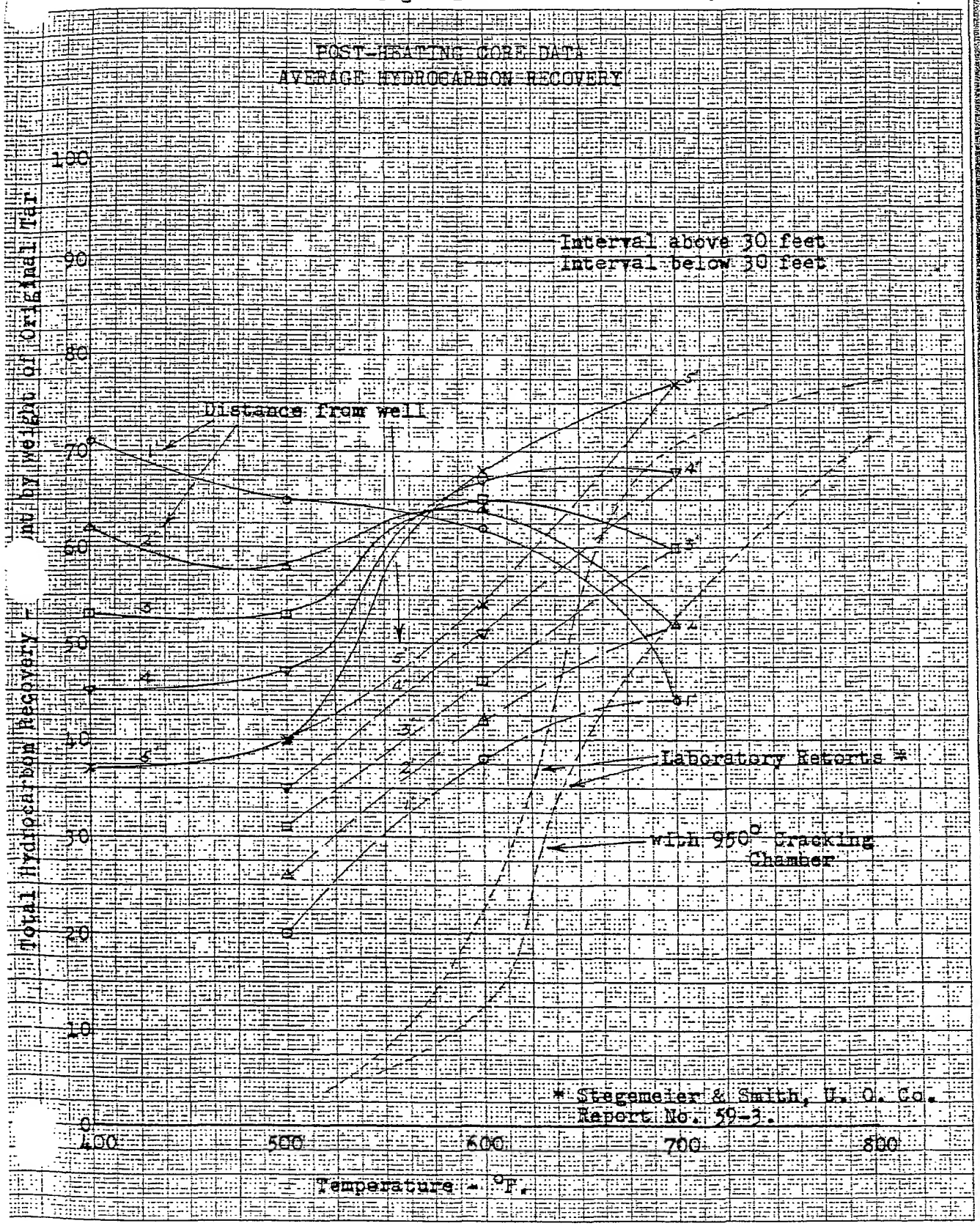
Figure 147

L9-216-3
5-18-59 RH



L9-703
5-14-59 RH

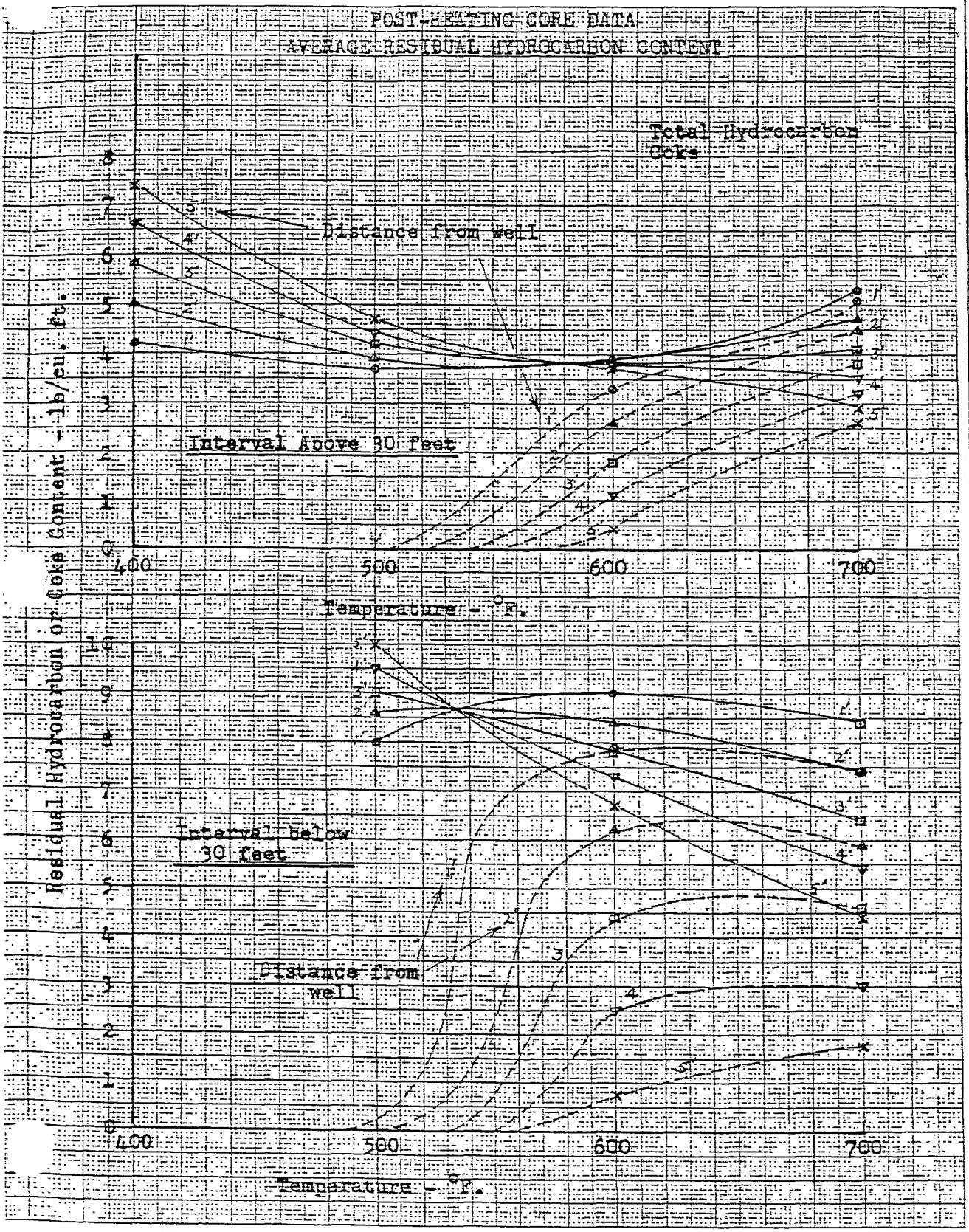
Figure 148



* Stegemeier & Smith, U. O. Co. Report No. 59-3.

Figure 149

L9-704
5-14-59 RH



L9-707
5-15-59 RH

Figure 150

SEPARATE GAS-OIL TEST IN 88-3

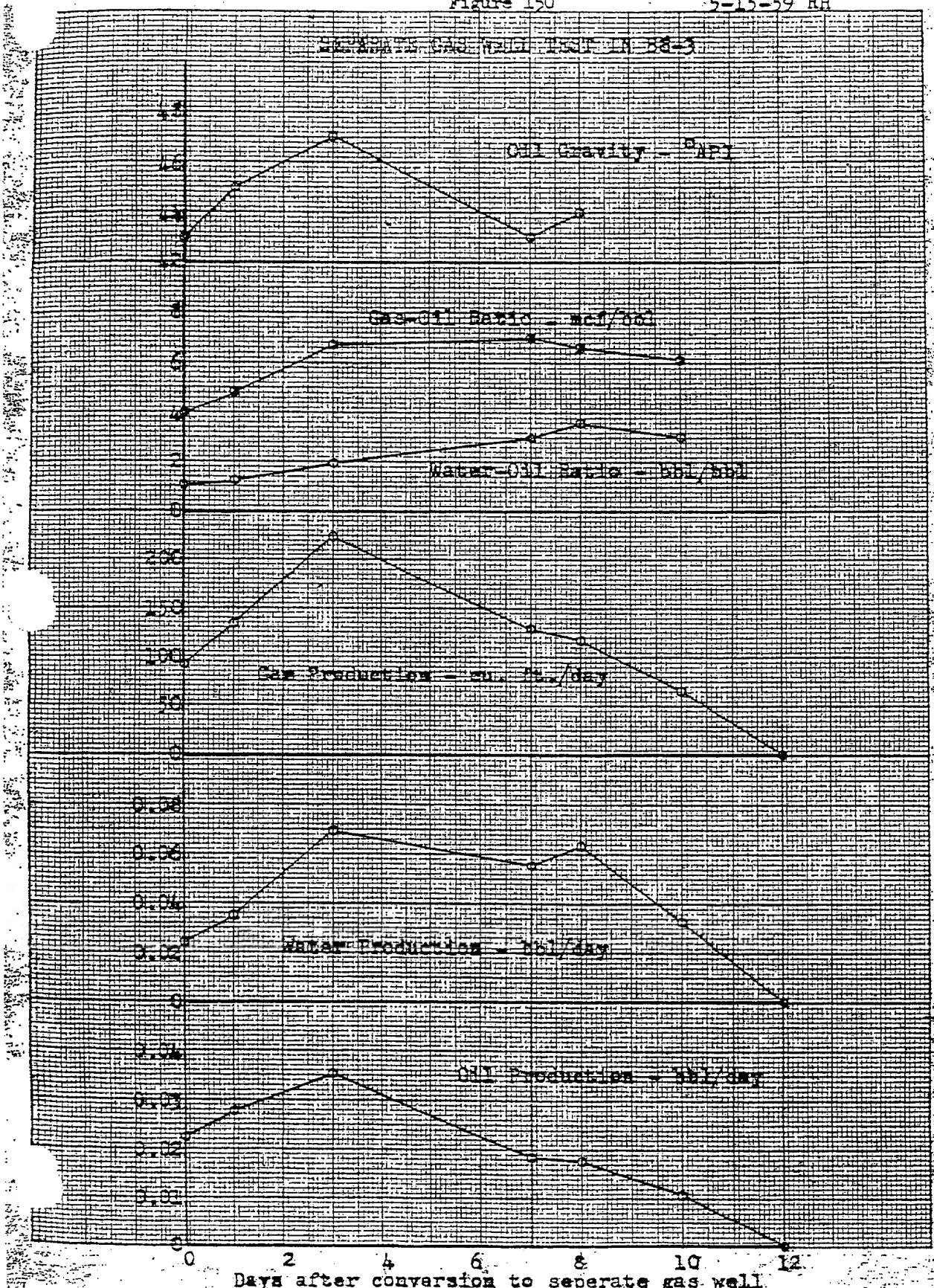
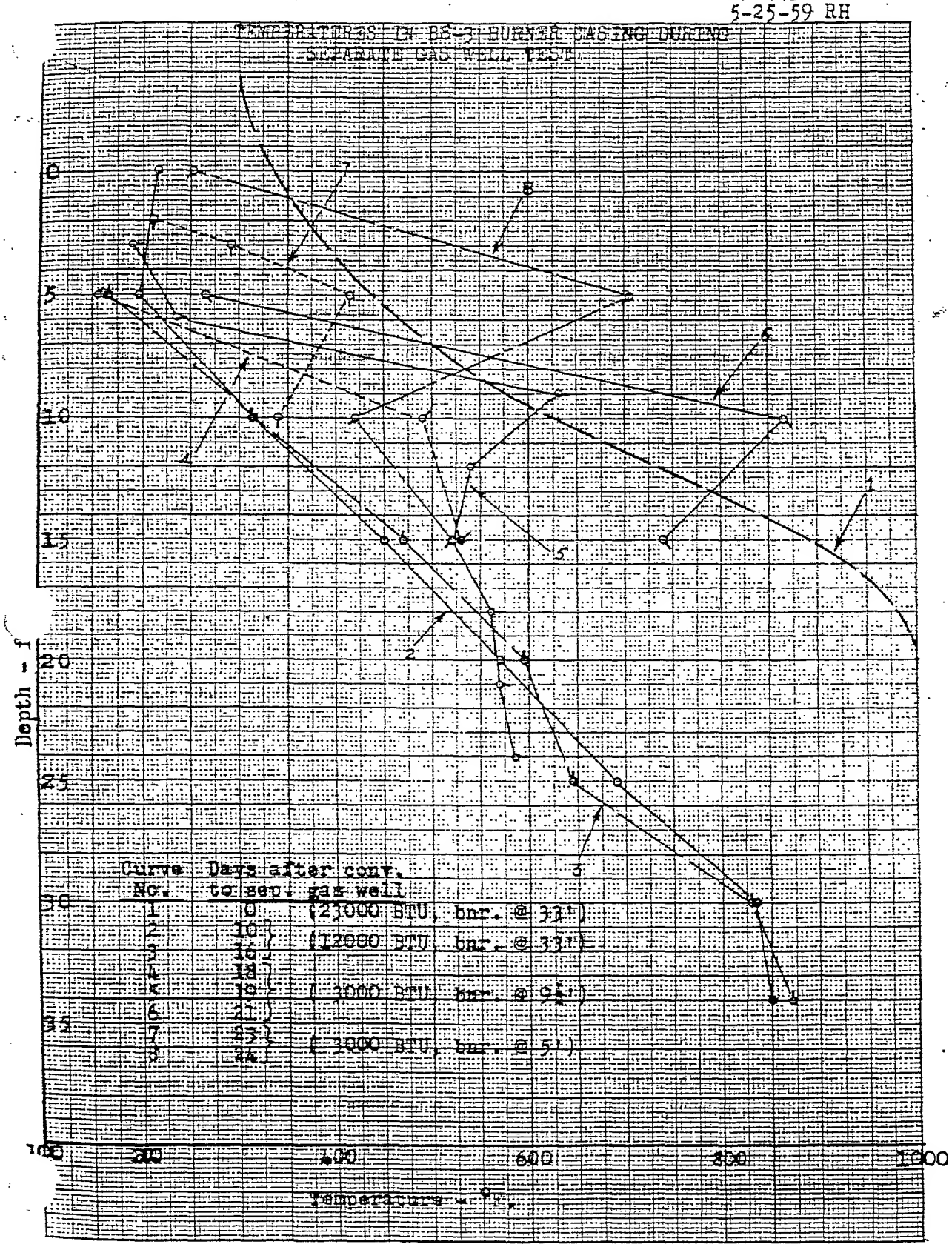


Figure 151

L9-443
5-25-59 RH

TEMPERATURES IN BS-3 BURNER CASING DURING SEPARATE GAS WELL TEST

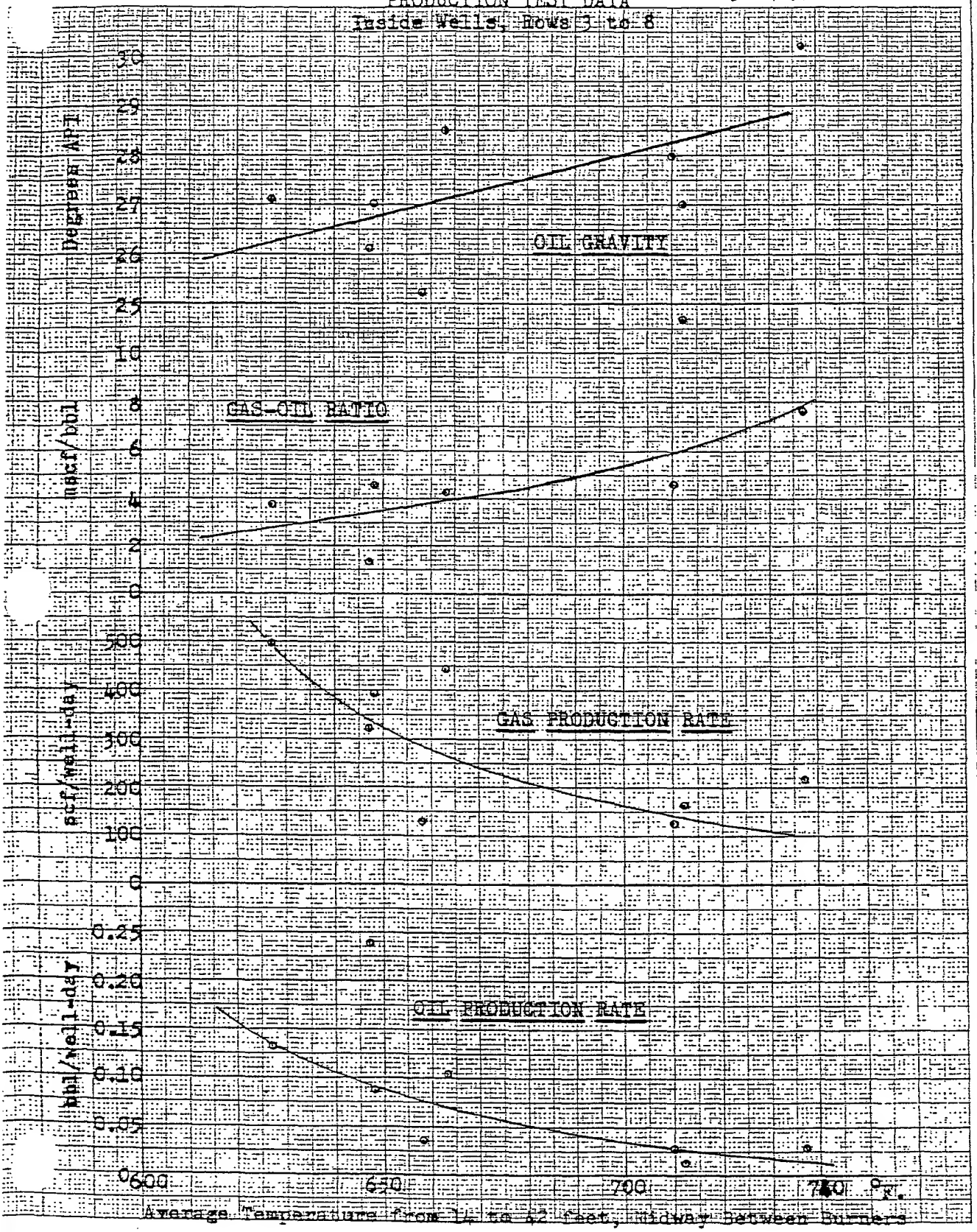


Curve No.	Days after conv. to sep. gas well	
1	0	(23000 BTU, bnr. @ 33')
2	10	(12000 BTU, bnr. @ 33')
3	16	
4	18	
5	19	(3000 BTU, bnr. @ 9½')
6	21	
7	33	(3000 BTU, bnr. @ 5')
8	44	

Figure 152

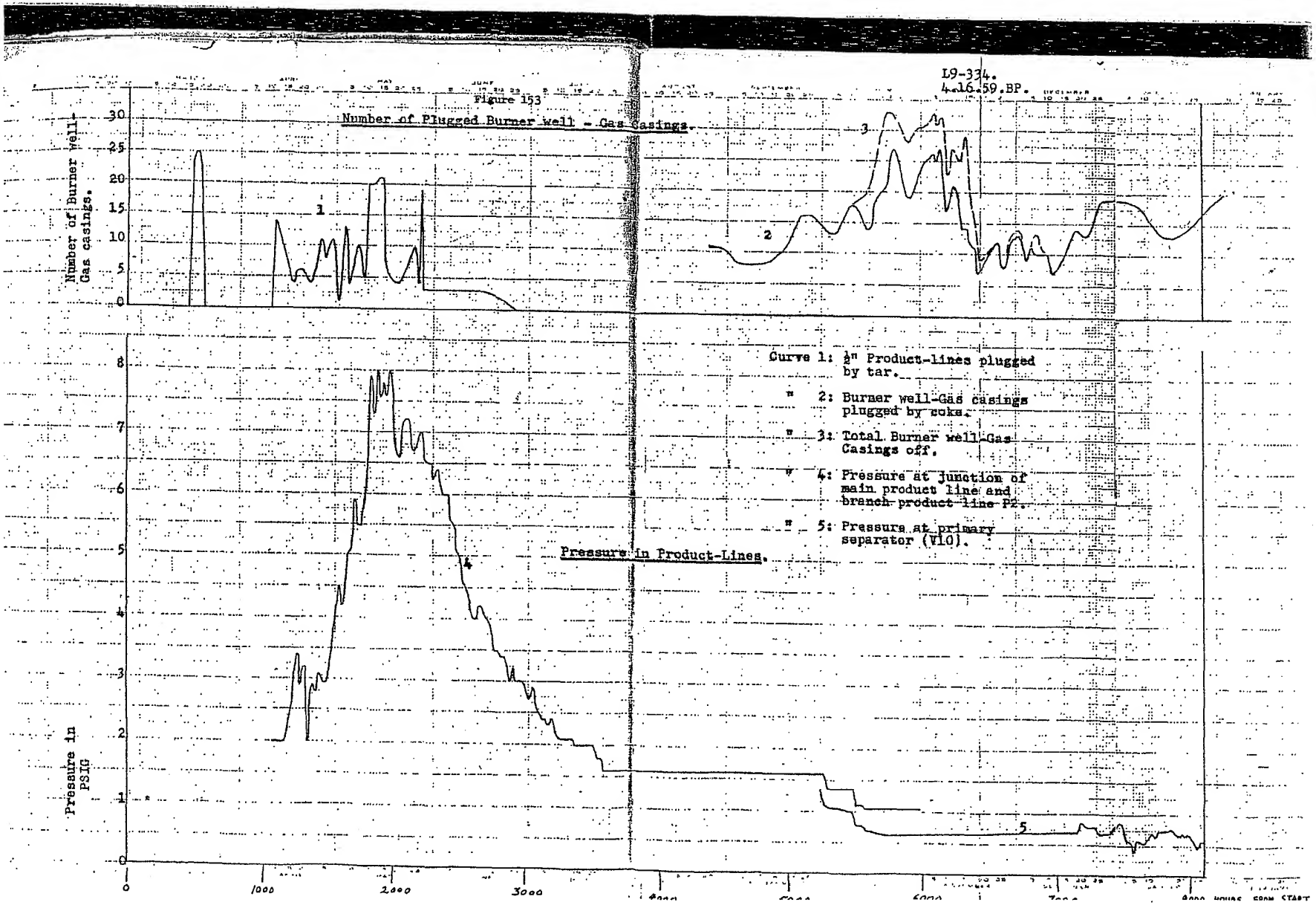
L9-706
5-14-59 RH

PRODUCTION TEST DATA
Inside Wells, Rows 3 to 8



L9-334.
4.16.59.BP.

Figure 153



Curve 1: ½" Product-lines plugged by tar.

" 2: Burner well-Gas casings plugged by coke.

" 3: Total Burner well-Gas Casings off.

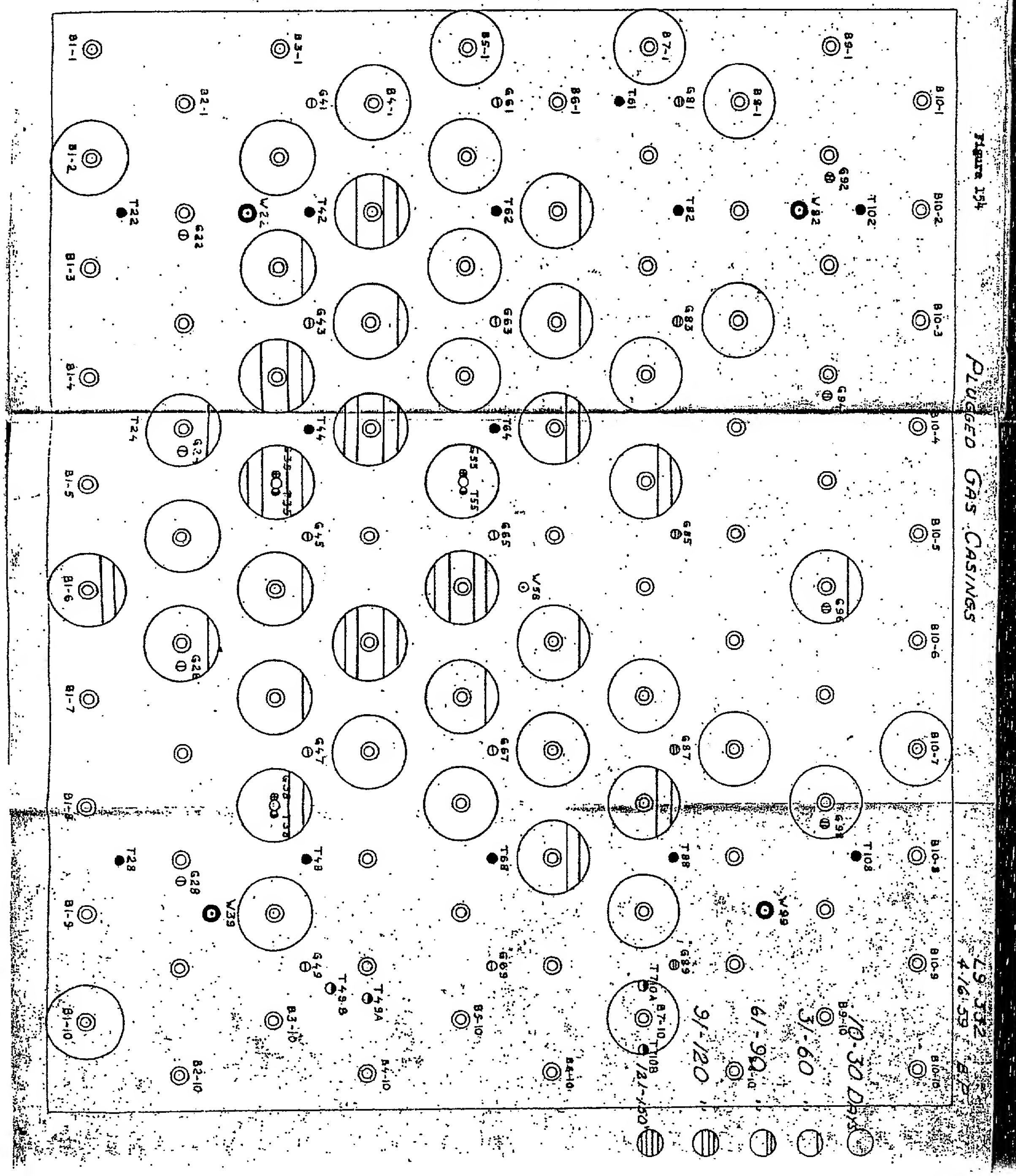
" 4: Pressure at junction of main product line and branch product line P2.

" 5: Pressure at primary separator (V10).

HOLE PATTERN OF TEST L9

L9-101
JAN. 21. 1958. BP
REVISED 3.15.58. BP

○ BURNER. 15' 5 5/8" AND 40' 4 3/4" HOLE. 52' 2-1/2" CASING.
◎ CONCENTRIC GASWELL AROUND BURNER. 13' 4.50"-4.22" CASING.
● SEPARATE GASWELL IN BURNERHOLE. 15' 1 1/2" CASING.
⦶ " " 2' FROM ADJACENT BURNER. 20' 3 3/4" HOLE. 15' 1 1/2" CASING.
⊖ " " 5'9" " " " " " " "
⦶ " " 2' " " 50' 3 3/4" HOLE FILLED WITH GRAVEL TO 15'. 15' 1 1/2" CASING.
⊖ " " 5'9" " " " " " " "
O CONCENTRIC GASWELL AROUND WATER WELL. 15' 4.50"-4.22" CASING.
⊙ WATER WELL, 5'9" FROM ADJ. BURNER. 55' 5 5/8" HOLE. 50' 1 1/2" TUBING. W56: 75' 5 5/8" HOLE. 40' 3 1/2" AND 10' 4" TUBING.
TEMPERATURE WELL, 5'9" FROM ADJACENT BURNER. 55' 3 3/4" HOLE. 52' 2" CASING.
● " IN BURNERHOLE. 52' 1" CASING.
◓ " 3' (T49B 4') FROM ADJACENT BURNER. 55' 3 3/4" HOLE, 52' 2" CASING.



HOLE PATTERN OF TEST L9.

L9-101.
JAN. 21. 1958. BP
REVISED 3.15.58. BP

- ○ BURNER. 15' 5⅝" AND 40' 4¾" HOLE. 52' 2½" CASING.
- ◎ CONCENTRIC GASWELL AROUND BURNER. 13' 4.50"×4.22" CASING.
- ● SEPARATE GASWELL IN BURNERHOLE. 15' 1½" CASING.
- ⊖ " " 2' FROM ADJACENT BURNER. 20' 3¾" HOLE. 15' 1½" CASING.
- ⊖ " " 5'9" " " " " " " " " "
- ⊖ " " 2' " " " 50' 3¾" HOLE FILLED WITH GRAVEL TO 15'. 15' 1½" CASING.
- ⊖ " " 5'9" " " " " " " " " "
- ◎ CONCENTRIC GASWELL AROUND WATER WELL. 15' 4.50"×4.22" CASING.
- ⊙ WATER WELL, 5'9" FROM ADJ. BURNER. 55' 5⅝" HOLE. 50' 1½" TUBING. W56: 75' 5⅝" HOLE. 40' 3½" AND 10' 4" TUBING.
- ● TEMPERATURE WELL, 5'9" FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.
- ● " " IN BURNERHOLE. 52' 1" CASING.
- ● " " 3' (T49B 4') FROM ADJACENT BURNER. 55' 3¾" HOLE. 52' 2" CASING.